The CHEMIST AND DRUGGIST

Established 1859 28 Essex Street, Strand, London, W.C.2. *Registered as a Newspaper*

No. 2790
VOL. CXIX. JULY 29, 1933 *Annual Subscription (with Diary)* 20/-. *Single Copies* 9*d.*

Index to Advertisers, pp. 5 & 6.

INSTANTANEOUS ELASTIC FIRST AID IN 3D. & 6D. TINS

Boxed 1 Doz. **Trade 2/- ,,**

Boxed 1 Doz. **Trade 4/- ,,**

Elastoplast Dressings are elastic, self-adhesive and antiseptic. They mould easily, the elasticity permits free movement, and they do not slip or ruck.

Every person who passes your window is a potential customer for one of these neat, compact and handy tins ! Display Elastoplast Dressings prominently and help to educate the public to be prepared and ***carry*** first aid.

Order a 1 dozen display box of each size from your usual wholesaler.

British Made by

T. J. SMITH & NEPHEW LTD.,

Dept. C. : NEPTUNE STREET, Hull.

and at London, Glasgow, Manchester.

Elastoplast

Regd. Name

ORDER FROM YOUR WHOLESALER — NOW

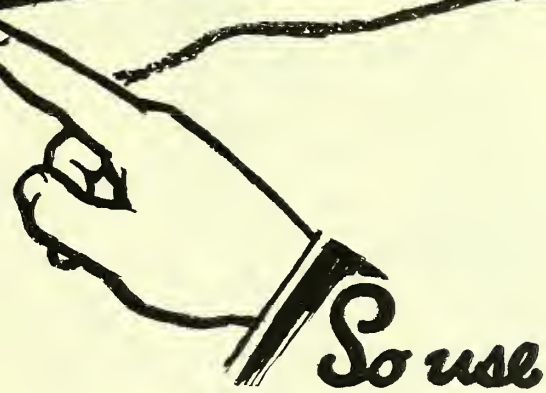
From a current Selo Press Advertisement

SELO for brilliant snaps on sunny days

SELOchrome for dull days & waning light

That's right . . . load up with Selo and you can't go far wrong. Wherever you're cruising, Solent or Mediterranean, Selo films will give you the maximum number of successful snaps. What[illegible]

And ask for your prints on Selo paper; it will put the finishing touch to your efforts.



So use

SELO

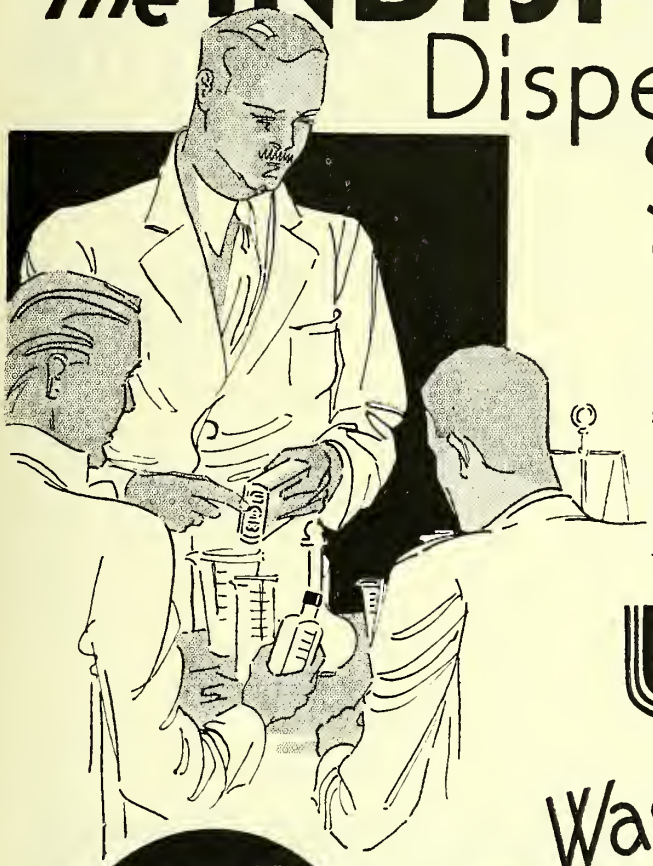
GASLIGHT

for D & P.

Made in England by
ILFORD LIMITED,
ILFORD, LONDON

A A

The INDISPENSABLE Dispensing Service!



THE special U.G.B. process of Sterilizing by passing every single bottle through boiling distilled water and drying in super-heated filtered air has proved a boon to the busy dispenser.

Straight from sealed fibre dust-proof cartons—ready for instant use—sparkling bright and scientifically sterile.

U.G.B Washed & Sterilized MEDICAL BOTTLES

Packed in Sealed Non-Returnable Standardized Fibre Cartons in the Following Quantities Only

1 oz.	Packed 2 gross per case.	8 oz.	Packed 6 doz. per case.
2 oz.	,, 1½ ,, ,,	10 oz.	,, 4 ,, ,,
3 oz.	,, 1 ,, ,,	12 oz.	,, 4 ,, ,,
4 oz.	,, 1 ,, ,,	16 oz.	,, 4 ,, ,,
6 oz.	,, 6 dozen ,,	20 oz.	,, 3 ,, ,,

UNITED GLASS BOTTLE MANUFACTURERS · LIMITED

The Largest Manufacturers of Glass Bottles in Europe.

40-43 NORFOLK STREET, STRAND, LONDON, W.C.2

Telephone: TEMPLE BAR 6680 (10 lines) *Telegrams:* "Unglaboman, Estrand, London"

Displays which bring INCREASED SALES and BIGGER PROFITS

ABOVE—Showcards to increase your sales of the Bob Martin supporting lines. RIGHT—The latest "Whimsical" cut-out. Raises a ready smile and makes a ready sale.

Pharmacists everywhere will tell you

A BOB MARTIN DISPLAY ALWAYS PAYS

INCREASED sales always follow when you show Bob Martin Display Material.

Year after year, for years past, a succession of the biggest advertising campaigns ever launched for dog medicines has convinced every thoughtful dog owner in the country that to keep his dog healthy and clean, and in every way a "fit" companion, he must use Bob Martin's Preparations. Every dog-owner in your district is a regular buyer of Bob Martin's Condition Powders and other Bob Martin preparations. You will be pleasantly surprised at the increased sales which follow immediately you show Bob Martin Display Material and so attract these customers to *your* pharmacy.

Mr. J. R. Thorton, M.P.S., 4 Stratford Road, Kensington, writes:—"As a result of a small display of your Dog Preparations inside my pharmacy the sales have more than trebled in a month."

A very popular two-piece display for Bob Martin's Condition Powders.

THESE BOB MARTIN DISPLAYS CAN BE MAKING MONEY FOR YOU WITHIN FORTY-EIGHT HOURS—WRITE TO-NIGHT

Display material for all Bob Martin lines is waiting to set your sales soaring. A few of the latest display pieces are shown here, but a complete range will be sent on receipt of a postcard. Write NOW to

BOB MARTIN LTD., DISPLAY DEPT., SOUTHPORT

A Bob Martin display makes Passers-Buy!

INDEX TO ADVERTISERS

[Continued overleaf.

3 Silent Salesmen

Beatty

Regd. No. 758534
4 oz. & 8 oz. capacity
Cap. Regd. No. 774021
Wide or Sprinkler Neck

Rhodes

Regd. No. 777437
9 oz. capacity
Cap Regd. No. 777437

Wellington

Regd. No. 773186
4 oz., 8 oz. & 16 oz. capacity.
Cap Regd. No. 774021
Wide or Sprinkler Neck

3 distinctive Toilet Bottles

that add charm and selling-power—English throughout

WHOLESALE ONLY

THE INTERNATIONAL BOTTLE CO. LTD.

48 FORE STREET, LONDON, E.C.2

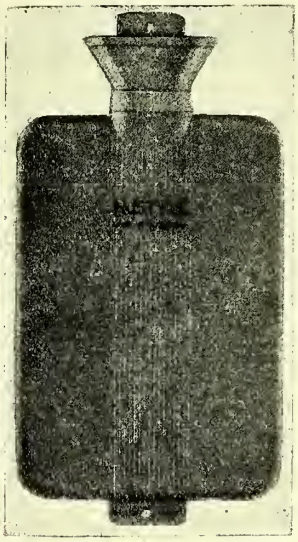
Phone: Met 6161 (4 lines) 'Grams: "Autrefois, Telex. London."

CANADIAN AGENT: JOHN H. KEENS, 24 WELLINGTON ST. WEST, TORONTO.

NUSTYLE

The Super Moulded Hot Water Bottle

Exclusive — Modern — For Pharmacists only

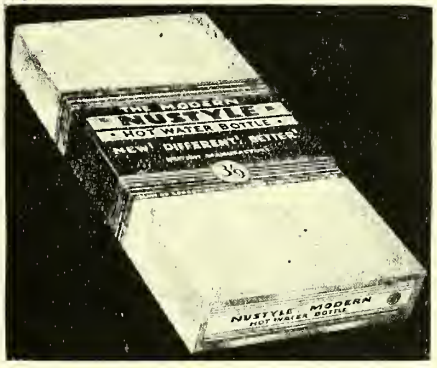


The Nustyle Hot Water Bottle

Squared, but well rounded shoulders, full capacity, ribbed centre motif, oblong name panel and matched tabs for hanging, satin smooth rubber, six tested colours: Jet Black, Standard Red, Emerald Green, Pastel Blue, Pastel Green and Rose Pink. British made throughout.

The Nustyle Moulded Hot Water Bottle is an exclusive production designed by Maw's to protect pharmacists from intensive price cutting. It is supplied only to qualified pharmacists and the chief aim of the production has not been 'HOW CHEAP,' but 'H-O-W S-M-A-R-T,' 'H-O-W G-O-O-D,' and 'H-O-W E-A-S-Y T-O S-E-L-L.'

Each Nustyle Hot Water Bottle is packed in a smart, attractively labelled box and a new polished wood salesmaker is supplied with orders for three dozen bottles only. This salesmaker occupies about half a square foot of counter space and is undoubtedly the finest selling aid for Hot Water Bottles ever devised.



Each bottle is individually packed in silver coloured box, with smart black and green labels. It keeps your stock tidy and protects the bottle from dirt or exposure. It is also convenient for handling or packing.

Price Per Dozen 30/=

Minimum Retail Each 3/9

Salesmaker free of charge with three dozen Nustyle Bottles, value 90/-, less 5% monthly only. The purchase of this salesmaker forms the basis of a contract for the season and repeat orders will be subject to an extra 2½%.

Extra Immediate Discount

We suggest a purchase of one dozen covers to suit, in special toned effects, at 12/- per dozen.

Purchasers of one dozen covers in addition to the salesmaker (90/- plus 12/-) 102/- all are offered an extra 2½% discount.

New Polished Wood Salesmaker

UNIQUE FEATURES

- Best Black polished wood construction throughout.
- Full streamline cabinet with full length glass and attractively sloped picture frame front (glass removable and renewable in case of accident).
- Instantly removable sales tray, interchangeable and renewable. Carries all labelling and sales appeals and has a dust-proof flush-fitting wood top.
- New smart green labelling with black, white, and silver decoration.
- This case will give 5 years' service without the necessity for its being returned for renovation. A new and improved Sales Tray will be supplied annually with nominal repeat orders, keeping the Case always up-to-date.

S. Maw Son & Sons Ltd., 7/12 Aldersgate Street, London, E.C.1

Hot Water Bottle Suppliers of Repute

TIME AND TURNOVER

LOSS OF TIME IN DELIVERY
means
LOSS OF TURNOVER TO YOU!

We have built up a despatch department that is second to none. Efficient, reliable and time-saving. But it may be news to you that we also have a wide delivery radius, not only in London but also in the suburbs and provinces, which is regularly covered by a fleet of speedy vans. Rail orders are despatched in free cases the same day as received.

So you will know that when you place an order with Butler & Crispe your instructions will receive urgent attention and the goods will be on your shelves . . . promptly.

BUTLER & CRISPE

for Service

80-84 CLERKENWELL ROAD · LONDON · E·C·1

Telephone : Clerkenwell 2661 **Telegrams : Alluwant, Smith, London**

Proprietary Medicine Vendors and Agents
Druggists' Sundriesmen

BOTH-WAYS TOOTH BRUSH

ATTRACTIVE — EFFECTIVE — DURABLE

HARD BRISTLE IN BEST BONE HANDLES

KEEPS ITS STIFFNESS

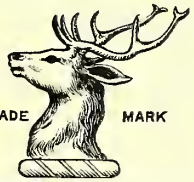
Gent's 11/- **Lady's 8/-**

(in single cartons 1/- per dozen extra)

EYEBROW & EYELASH BRUSHES

BONE Handles, black or white bristles **2/6** per doz.
ERINOID Handles, assorted colours ... **4/6** „

ATTRACTIVE SHOWCARD
containing two Sets Bone Brushes and four Sets Erinoid (a Set is one each Eyebrow and Eyelash) **3/9** per card
Same assortment, unmounted **3/6.**



BIDWELLS, AXMINSTER BIDWELL BIDWELL & Co LIMITED.

Sell Hand-honed Blades!

A quality Blade at a mass production price. Satisfaction for your customers, more profits for you. Send for sample to Dept. C.D.

LONDON & PROVINCIAL FACTORS, LTD.
146 Theobalds Road, W.C. 1,
and at
16 Withy Grove, Manchester.

Irish Free State Agents:
Messrs. W. A. FREEDMAN & CO., 20/21 Merchants Quay, Dublin.

Wholesalers are invited to apply for Trade Terms.

WANIE

SINGLE SIDED
9/- per 100

THREE HOLE
8/- per gross

LESOURD PIVERT

(LONDON & PARIS)
ESTABLISHED 1876

WISHES TO ANNOUNCE THAT THOUSANDS OF WOMEN HAVE DISCOVERED

"My Secret"

BEAUTY PRODUCTS

POWDER, ROUGE, LIPSTICK and NAIL POLISH, Etc.

RETAILING AT 6d. & 1/-

TO BE THE IDEAL COMBINATION FOR A PERFECT COMPLEXION

THOUSANDS MORE WILL BE EAGER TO LEARN "THEIR" SECRET

ARE YOU READY TO DISPLAY THIS NEW POPULAR RANGE AND MEET THE INCREASING DEMAND IN **YOUR** DISTRICT

ORDER NOW AND FEATURE THESE WIDELY-RECOMMENDED COMPLEXION AIDS, WHERE YOUR WOMEN CUSTOMERS CAN SEE THEM

GENEROUS TRADE TERMS

WRITE TO:

Distributors

E. BLOM & CO.

52 ARTILLERY LANE, LONDON, E.1.

PHONE NO.: AVE. 3860

Continuous and Steadily Advertised Goods

FOR DESTROYING RATS AND MICE

DANYSZ VIRUS

Retail Price (Protected)		Net Wholesale Price
Virus for Rats and Mice, single tube, 2/– .. 3 tubes, 5/–		15/– per doz.
Virus for Mice only .. single tube, 1/6 .. 3 tubes, 3/–		9/– „

Date-expired tubes returned to us postage paid will be exchanged free of charge.

Danysz Virus in Liquid Form

Retail Price		Wholesale Price
Quart Bottles	6/– each	4/6 each
Pint	4/6 „	3/9 „

HALLER'S EXTRACT OF SQUILL and DANZO RAT KILLER

Discount off Retail Prices 25% Monthly Account, or 33⅓% cash with order.

	Retail	Monthly A/c	Cash with Order
½ gall. tins	10/–	7/6	6/8
1 „ „	18/–	13/6	12/–
5 „ „	80/–	60/–	53/4

DANZO BEETLE POWDER

For destroying Blackbeetles, Cockroaches, Crickets, &c.

Retail Prices (Protected)	Wholesale Prices per doz.
In tins 3d.	In boxes of 2 doz. 2/1
„ 6d.	„ 1 „ 3 8
„ 1/–	„ 1 „ 7/3
„ 2/6	„ 1 „ 18/–

Danzo Beetle Powder will not deteriorate by keeping.

CARRIAGE PAID ON ALL ORDERS.

To be obtained from

HALLER LABORATORIES, LTD.

325 Borough High Street, LONDON, S.E.1

Telegrams: "Virudana, Sedist, London." Telephone: Hop 2717

English Filter

POSTLIP

Papers

SQUARES
CIRCLES
FOLDED
ROLLS

WHITE
GREY
PLAIN
ANTIQUE
EMBOSSED
CRINKLED

SAMPLES
FREE

Postlip Filterings are stocked by all the leading Wholesale Laboratory Dealers.

Evans, Adlard & Co. Ltd

Postlip Mills, Winchcombe, Cheltenham.

The attractive set of showcards available, includes the centre-piece in full colours here reproduced.

A Flit Display brings you more customers and larger profits!

Flit advertising, comprising more than fifteen million messages, cannot fail to reach and impress the majority of the people that pass your store. They look for a sign in your window that Flit is available. A display of the attractive Flit showcards will bring these people into your store to buy Flit — and other goods.

Furthermore, your profit on every sale of Flit is increased through window displays. Select one of the bonus offers below, or write for complete list.

Specimen Bonus Offers for Window Display

INCLUDING NEW SIZE SELLING AT 1/3

NO.			LIST PRICE	CHARGED AS
1.	1 Doz.	2/- Tins	17/- doz.	11 tins only
2.	1 „	3/- „	25/6 „	11 „
3.	1 „	5/- „	42/- „	11 „
4.	1 „	2/3 Hand Sprayers	19/- „	11 only
5.	2 „	1/3 Tins	11/- „	23 tins only
9.	2 „	1/9 Trial Outfits ...	14/6 „	23 only

Every Offer Carriage Paid

Sole Distributors for the United Kingdom: STEMCO LIMITED, 128-132, Albert Street, Camden Town, N.W.1

NOW IN SEASONAL DEMAND

All whose work or pleasure takes them into the open-air are prospective customers for 'SKETOFAX.'

For use against mosquitoes, gnats, midges and sandflies.

Soothes bites inflicted when unprotected.

Convenient, non-staining, portable.

Applied direct from the tube.

TRADE MARK **'SKETOFAX'** BRAND

AROMATIC CREAM

Price in London to the Trade

Collapsible tubes, **12/6** *per doz. (subject)*

Sells at sight.

Keep a display on the counter throughout the open-air season.

Sales-aids free on request

BURROUGHS WELLCOME & CO., LONDON

G 1747

THE *NEW*
EASTERN FOAM

P.A.T.A. PRICES

Home Trade Only.

1/3 JARS	10/- per doz.	
Display Terms		
3 doz. ..	9/9	„ „
12 „ ..	9/6	„ „
6d. TUBES	4/-	„ „
Display Terms		
3 doz. ..	3/11	„ „
12 „ ..	3/10	„ „
3d. SAMPLE BOXES	24/- per gross	
Quantity Terms		
12 doz. ..	23/-	„ „
60 „ ..	22/-	„ „

PUBLICITY!

Our advertisements are now appearing in the daily and weekly press. Pharmacists are urged to link up with the advertising by displaying the product, and the window bill (copy on request) announcing that

THE NEW EASTERN FOAM IS HERE

A product of THE BRITISH DRUG HOUSES LIMITED

THE
CHEMIST AND DRUGGIST
A Weekly Journal of Pharmacy, the Drug, Chemical and Allied Trades

The official organ of The Pharmaceutical Society of Ireland, The Chemists' and Druggists' Society of Ireland, and of other Chemists' Societies in Overseas Dominions

CONFERENCE NUMBER, 1933

PUBLISHED AT

28 ESSEX STREET, STRAND, LONDON, W.C.2

Telegrams: "Chemicus, Estrand, London" *Telephone: Central* 6565 (8 *lines*)

BRANCH OFFICES

4 CANNON STREET, MANCHESTER (TEL.: BLACKFRIARS 3052) 54 FOSTER'S BUILDINGS, HIGH STREET, SHEFFIELD (TEL.: 22458)
19 WATERLOO STREET, GLASGOW (TEL.: CENTRAL 2329) 39 QUEEN STREET, MELBOURNE, AUSTRALIA
155 AVENUE DE WAGRAM, PARIS, XVII[e] (TEL.: GALVANI 19-79)

CONTENTS

VOL. 119. NO. 2790 JULY 29, 1933

News of the Week

Merchandise Marks Act, 1926—Thermometers

The Board of Trade have issued the Merchandise Marks (Imported Goods) Exemption Direction (No. 2), in which it is provided it shall be sufficient compliance with the provisions of Article 4 of the Merchandise Marks (Imported Goods) No. 5 Order, 1929, if in the case of any mounted thermometer the indication of origin is stamped, printed, impressed, stencilled or branded in a contrasting colour on the front of the scale or mount.

Committee on Gift Coupons and Trading Stamps

The report of the Committee on Gift Coupons and Trading Stamps has been issued (Cmd. 4385: 3d.) by the Stationery Office. The principal conclusions are as follows:—

The conclusions which we have reached from a consideration of the arguments on both sides are that the gift coupon system is not detrimental to the public interest.

To our mind the strongest argument brought against gift coupon trading is the undoubted dislocation and uncertainty which it may cause to trades ordinarily distributing goods of the kinds offered as gifts. We do not, however, believe that the harm done is as great as is sometimes represented, nor that any reactions upon the general public are likely to be important.

We consider that the collector of gift coupons does actually obtain in the gift something that he would not otherwise get. Whether this is correctly described by the word "gift" appears to us to be of small importance, and we see no reason to suppose that any substantial proportion of people are deluded into believing that they are getting something which is not covered by the price which they pay.

From the point of view of many manufacturers the gift coupon system is a valuable method of sales promotion, and we attach particular importance to the argument that the system is in some cases the only practicable method open to a newcomer to gain a footing in competition with established concerns. In our view it would be detrimental to the public interest to discriminate by law against methods of obtaining trade which are specially useful to new producers.

We considered the possibility of a compromise between the advocates and the opponents of gift coupon trading on the line of requiring gift coupons to be made redeemable in goods or alternatively in cash at the option of the holder. The cash payment would represent of course the cost of the gift to the manufacturer, not its value at retail. We did not find that the proposal would be acceptable and we see no reason to compel its adoption.

There is evidence to show that trading stamp organisations owe their origin to the necessity of providing the individual trader with a means of competing with his larger and more established rivals by giving to his customers in return for their patronage benefits comparable with the benefits which they would receive if they dealt with such rivals, and our conclusions are that trading stamp organisations are not detrimental to the public interest so long as they are conducted with integrity.

We have had some evidence that in a fairly numerous and possibly increasing class of cases individual traders have been constrained to accept the services of trading stamp organisations against their will by the fear that

if they did not do so their customers would transfer their custom to other retailers who were prepared to do so. This we regard as an undesirable feature of stamp trading, but in our view the proper remedy is for the individuals through their trading associations to combine and either to abjure the use of trading stamps altogether or to perform for themselves the functions which are now being performed by the trading stamp organisations.

For the reasons set out above we have arrived at the conclusion that both as regards gift coupons and trading stamps the practices which the Gift Coupons Bill seeks to make illegal are not detrimental to the public interest and do not call for any legislative intervention.

Miscellaneous

LONG SERVICE AWARDS.—The following presentations have been made recently to commemorate the completion of twenty-one years' service with Burroughs Wellcome & Co., at the Wellcome Chemical Works, Dartford: Mr. Sidney Martin, a mahogany chiming clock; Mr. Cecil Nelson Benson, a silver presentation watch.

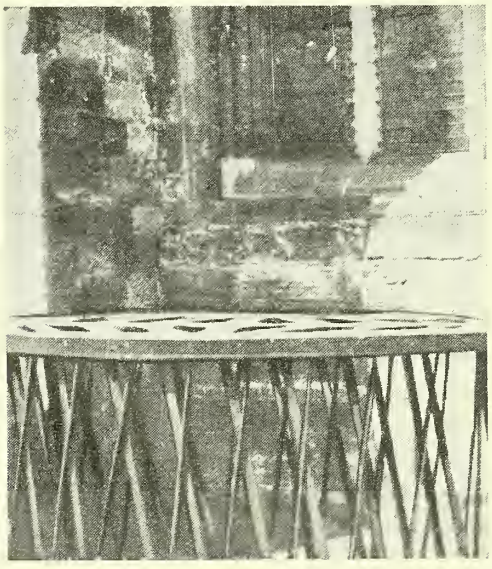
FREE DISINFECTANT DISCONTINUED.—Acting on the advice of the Cleveland medical officer of health, the Skelton and Brotton Councils have decided to discontinue the issue of free disinfectants to the people of their towns. This service cost the towns an average of £386 a year, or about 6.72d. per head of the population. In his report the medical officer states that the practice of the free issue of bottles or tins of disinfectant by the sanitary authority to any member of the general public on request has engendered the idea that it is a simple matter by the application of disinfectant to kill germs, and that the issue of disinfectant will result in the prevention of disease. The final result on the public health may, he adds, be harmful, from concealing the need for a thorough cleansing.

Scottish Notes

Brevities

Twenty members of the Edinburgh Chemists' Golf Club took part in a competition over the Liberton Club's course on July 19. The result was: (1) J. Gray Madder (14), 67; (2) A. Nicholson (17), 70; (3) R. S. Harvey (15), 73.

A controversy has been aroused by the proposal of Linlithgow Town Council to present an important London museum with one of the old mort safes used in the



early nineteenth century as a protection against body-snatching. Mr. Alexander Spence, chemist, Newington, Edinburgh, is one of those who consider that the legal position should be completely settled before so interesting a relic is allowed to leave the town. He claims to be the direct representative of one of the members of the Association to which these safes originally belonged. Our illustration shows a mort safe standing against St. Michael's Church, Linlithgow.

Irish Notes

Pharmaceutical Society of Ireland

Of the large number of candidates who took the July Licence examination of the Pharmaceutical Society of Ireland this week, eighty-one candidates were rejected, one retired owing to illness, and the following (arranged alphabetically) passed:—Atwool, E. D., Austin, R. L., Barragry, J. F., Browne, James, Burke, Catherine, Campbell, K. J., Kennedy, E. M. (Miss), Kiernan, M. A. (Miss), Lenihan, M. J. (Miss), Moriarity, G., McDevitt, J. B., O'Sullivan, Bartholomew, Orr, M. G. H., Rohan, J. J., Smith, B. R.

Brevities

The Pharmaceutical Society of Northern Ireland was represented at the London meeting of the British Pharmaceutical Conference by the president (Mr. R. I. Edwards), Mr. J. E. Connor, Mr. Fred Storey, Mr. H. F. Moore, Mr. S. H. Forrest and Mr. D. L. Kirkpatrick (secretary).

The "Irish Independent," in its special issue to commemorate the holding of the British Medical Association's Conference in Dublin, devotes an entire page of an excellent supplement to Irish pharmacy under the heading "What M.P.S.I. Stands For." The page has pictures of Sir Thomas Robinson, M.C.P.S.I., and of Mr. J. J. R. Kerr, P.C., M.P.S.I., the registrar of the Society.

A. de St. Dalmas, Ltd., Middle Abbey Street, Dublin, held their annual staff outing last week-end at Kilmacurra Park, Kilbride, co. Wicklow, to which a party of over sixty headed by Mr. A. W. Hughes (manager) travelled in buses. An enjoyable day was spent in sports and sightseeing. The day was brought to a close with tea and a dance at the Kilmacurra Park Hotel. The excursion party included the sales representatives, Messrs. W. M. Birmingham and W. McCaw Smith.

While members of the British Medical Association were sitting in Council at one end of Dublin, Dr. Theodore A. Cronhelm, L.P.S.I., was creating a swimming record at the other end of the city by swimming across Dublin Bay, from Howth to Dun Laoghaire, a distance of approximately eight miles, in four hours and twenty minutes. Dr. Cronhelm, when seen by the *C. & D.* representative, would say little about the swim, but spoke freely of his associations with pharmacy, of which he is proud. A native of Rathdrum, Dr. Cronhelm served his time in Clonmel. He next went to Sligo, and subsequently transferred to Mr. Victor E. Hanna's pharmacy, Lower Mount Street, Dublin. He qualified as a Licentiate of the Pharmaceutical Society of Ireland in 1918. Early during the Great War he joined up and saw service in France. Dr. Cronhelm, who is in practice at St. Alban's, Warrington Place, Dublin, has a brother, Mr. J. H. Cronhelm, L.P.S.I., in pharmacy at Strandtown, Belfast.

DR. T. A. CRONHELM, L.P.S.I.

Mr. Armar J. Donnell, L.P.S.I., who has been co-opted to the board of Hayes, Conyngham & Robinson, Ltd., chemists, 12 Grafton Street, Dublin, served his apprenticeship with the late Dr. McCaul, Londonderry, and gained further experience as an assistant with Mr. William Hanna, Ph.C., Bangor, co. Down, Mr. T. C. Cornwell, Ph.C., Stoke-on-Trent, and Hayes, Conyngham & Robinson, Ltd., Dublin. Mr. Donnell passed the Licence examination in 1916, gaining the silver medal for that year. He remained with Hayes, Conyngham & Robinson, Ltd., as manager of their Rathgar branch, and later served as manager of Bell Brothers, Waterford, for some years. He then represented Bayer Products, Ltd., in Ireland, and four years ago he joined the staff of Hayes, Conyngham & Robinson, Ltd., as sales manager.

Mr. Armar J. Donnell, L.P.S.I.

Summer Outings

Staff Outing

The annual outing of the employees of National Drug Industries, Ltd., manufacturing chemists, took place on July 15 in the form of a visit to Margate. The party met at the Grand Hotel for dinner, which was presided over by the managing director (Mr. W. J. Beardsley), who was supported by the departmental managers and a number of the company's representatives. After Mr. Beardsley had read telegrams of good wishes from the chairman of the company (Mr. H. Vincent Dodd), absent directors and country representatives, he proposed the toast of "The Firm," which was responded to by Mr. A. McDonald (assistant manager). The toast of "The Representatives and Staff" was supported by Messrs. T. Godbold and F. T. Holland (representatives) and acknowledged by Messrs. T. G. Don (secretary), W. Willbourne (dispatch manager), H. Holmwood and A. Scrase (secretary and treasurer of the staff committee). Although only the second annual outing of the company's employees, the occasion was the continuance of an old custom of the constituent concerns, and there were many present who specially appreciated the chairman's humorous reminiscences of an outing over which he had presided twenty-five years previously in which they had taken part. The rest of the day was spent in enjoyment of the attractions of Margate.

Pharmaceutical Society of Great Britain

Examination Results

Pharmaceutical Chemist Qualifying Examination

The following are the results of the Pharmaceutical Chemist Qualifying examination held in London this month:—Entered, 37; passed, 14; failed, 17; referred, 3; absent, 3. The following were successful:—Crees, P., Fishburn, A. G., Geard, D. H., Green, H., Gurd, M. R., Howard, W. R., Mason, Fanny E., Minor, R. G., Mozley-Stark, Christobel E., Page, G. R., Read, F. E., Sismey, Kathleen, Steel, D. J., Withell, E. R.

Topical Reflections

By Xrayser

The London Conference, 1933, whatever it may accomplish in other directions, will stand out in future records as that held during one of the most critical years in the history of British pharmacy. Apart from that, however, it cannot fail to attract distinction such as does not fall to the lot of similar gatherings every year. Its proceedings will be conducted by a chairman who occupies a position of especial importance in connection with the production of the British Pharmacopœia, had previously made for himself a high reputation as a hospital pharmaceutist, and capped what all his predecessors had done by taking degrees in both science and medicine. As one of the honorary secretaries of the British Pharmaceutical Conference, he earned well-merited promotion. He is not, I believe, one of those who are disposed to encourage submergence of the Conference Executive's usefulness in advancing the science of pharmacy, and it is most sincerely to be hoped that his influence may be exerted, and prove sufficiently powerful, to check any reaction against the primary object for which the British Pharmaceutical Conference was established. As you remarked last week (p. 101), the original objects of the Conference should not be forgotten, and I am with you in insisting that the order of their importance ought not to be changed.

Should the Scientific Phase, which was undoubtedly intended originally to be the principal feature of the Conference, be allowed to recede? I think not, and I trust that every effort will be exerted by those who are concerned about the development of pharmacy on modern progressive lines to avoid any risk of the scientific side being swamped by social functions, or by the spending of time needlessly at meetings of delegates for whom it appears to be so difficult to find appropriate topics for discussion. The propaganda value of the publicity given to the Conference proceedings in the daily Press is nowadays much lower than it was in the days when attention was directed mainly, if not entirely, to the presidential address and scientific papers read at the meetings, and it will continue to lose in value and force if social gatherings and private business meetings of delegates are allowed to encroach further upon our time.

Pharmacy Needs to be Advertised just as much as medicine secures advertisement through the publicity inspired by the meetings of the British Medical Association. In one way or another we are kept aware of medical activities which are not a whit more important or interesting generally to the British public than are quite a number of things that we should be able to talk about impressively at meetings of pharmaceutical delegates. As an instance of what would almost certainly have proved a suitable topic this year, I need only refer to the celebrations that have already marked the twenty-first anniversary of the initiation in this country of National Health Insurance. At the outset of the existing scheme the Pharmaceutical Society was able to exert much influence in shaping its development, so far as the provision of medicine is concerned; and it might well have taken advantage of the present opportunity of reminding the world of the share chemists have taken in making the scheme the great success it is now assumed to be.

New Companies
and Company News

P.C. means Private Company and R.O. Registered Office

Supro, Ltd. (P.C.).—Capital £200. Objects: To carry on the business of chemists and druggists, etc. R.O.: 569 Garrett Lane, Earlsfield, S.W.

Roscoe (Chemists), Ltd. (P.C.).—Capital £100. Objects: To carry on the business of manufacturers of and dealers in chemicals, gases, drugs, medicines, etc.

Hall & Lawton, Ltd. (P.C.).—Capital £1,000. Objects: To carry on the business of chemists, druggists, etc. R.O.: 6 Caldbeck Parade, Worcester Park, Surrey.

Vaccineat, Ltd. (P.C.).—Capital £100. Objects: To carry on business as patent medicine manufacturers and vendors, chemists, druggists, etc. R.O.: 6A Tudor Street, E.C.4.

Collingwood Pharmacy, Ltd. (P.C.).—Capital £200. Objects: To carry on the business of chemists, druggists, photographic dealers, etc. R.O.: 59 Brady Street, Whitechapel, E.1.

New Milton Pharmacy, Ltd (P.C.).—Capital £500. Objects: To acquire the business of chemists and druggists hitherto carried on at Station Road, New Milton, Hants, by Hants Pharmacies, Ltd.

H. I. Jones, Ltd. (P.C.).—Capital £100. Objects: To carry on the business of wholesale and retail chemists and druggists, manufacturers of and dealers in toilet preparations, etc. R.O.: 67 Lord Street, Liverpool, 2.

Coley Thermometers, Ltd. (P.C.).—Capital £1,000. Objects: To carry on the business of dealers in and manufacturers and repairers of scientific and technical instruments and appliances, thermometers, surgical instruments, etc. R.O.: 183A Hanworth Road, Hounslow.

Browns Chemists (Stoke-on-Trent), Ltd. (P.C.).—Capital £15,000. Objects: To acquire the business of chemists and druggists, carried on by G. W. Brown, Ltd., at Stoke-on-Trent and elsewhere in Staffordshire.

William Baillie (Peebles), Ltd. (P.C.).—Registered in Edinburgh. Capital £2,000. Objects: To acquire from the representatives of the late William Baillie the business formerly carried on by him at 32 and 34 High Street, Peebles, and to carry on the business of chemists, druggists, opticians, etc.

Super Products, Ltd. (P.C.).—Capital £1,000. Objects: To acquire the business now carried on at 5 Stony Lane, Sparkbrook, Warwickshire, as "Super Products," and to carry on the business of manufacturers of and wholesale and retail dealers in all goods and preparations usually sold at chemists and druggists. R.O.: 63 Temple Row, Birmingham.

Honicose Products (Sales), Ltd. (P.C.).—Capital £10,000. Objects: To acquire from G. S. Clegg and R. H. Jackson the benefit of an agreement dated July 17, 1933, between themselves and Meadowcroft & Co., Ltd., for the taking over and development of the sole and exclusive selling rights of a glucose product in palatable form known as "Honicose" in the U.K. and elsewhere, to prepare, manufacture and market glucose products, and to carry on the business of manufacturers of medicines, medical preparations, drugs, toilet preparations, etc. Solicitors: Chorlton & Galloway, Manchester.

The Chemical and Metallurgical Corporation, Ltd.—Shareholders have been advised that Imperial Chemical Industries, Ltd., have made an offer to purchase the issued share capital, on the following terms:—For every ten fully-paid eight per cent participating preference shares of £1 each the I.C.I. will issue eight fully-paid I.C.I. ordinary £1 shares, and for every fifty fully-paid ordinary shares of two shillings each, four fully-paid I.C.I. ordinary shares. For each option certificate, entitling the owner to take up one ordinary share of the corporation at par, I.C.I. will pay 1½d. in cash. The ordinary shares of I.C.I. to be issued will rank for dividend from January 1, 1933. The directors of the corporation propose to accept the offer in respect of their own holdings and option certificates, and recommend its acceptance to all shareholders. Meeting at River Plate House, E.C., on July 31, at 2.30 p.m.

Boots Pure Drug Co., Ltd.—In May, when the controlling interest in the company was repurchased by a British group from Drug Incorporated, a pool was formed of 1,000,000 shares which were the subject of the purchase. The pool was to continue until August 4, but the managers have now written to the participants recommending its continuance for a further three months until November 4. They report that of the 1,000,000 shares originally purchased 359,500 shares were withdrawn from sale, and are held almost entirely by important institutions by way of permanent investment; and that of the remaining 640,500 shares, 96,075 shares, or fifteen per cent., of the shares left for disposal have so far been sold. These shares have been sold at an average profit of 12s. per share net, as against the agreed minimum of 7s. per share. In view of this fact, the pool managers believe that it is in the best interests of all concerned that the unsold balance of 540,425 shares should be left with them for sale for a further period of three months on the same terms as before. The renewal is to come into operation if the holders of at least ninety per cent. of the unsold shares agree; the pool managers have consulted purchasers of over seventy per cent., all of whom have intimated their intention of continuing.

British Tintex & Dye Products, Ltd.—Circular states that as from March 1, 1932, company resumed control of its own sales organisation with results that on June 30, 1932, when accounts for year ended March 31, 1932, were submitted, months March, April and May, 1932, showed that profit was made. Extraordinary meeting was held immediately afterwards, when resolution was passed approving a scheme for reduction of capital, which was eventually sanctioned by Courts. Scheme provided for creation of preferred ordinary shares to value of £24,967. Response from shareholders was inadequate for purpose aimed at, and, as result, company has since been handicapped owing to lack of working capital. Board has decided to recommend that company be reconstructed. Scheme provides for company to be placed in voluntary liquidation and for new company to be formed to take over its assets and liabilities. Each shareholder will have right to take up one share for two shillings of new company credited with one shilling and sixpence paid up in exchange for each fully-paid share held in this company. Remaining liability of sixpence per share will be payable as to threepence per share on application and balance of threepence on allotment. Scheme, should all shares of new company be allotted and paid up in full, will provide new company with £17,503 5s. in cash. Extraordinary meeting will be held at Incorporated Accountants' Hall, Victoria Embankment, W.C.2, on August 15, at noon. The following resolution will be put to the meeting:—That liquidator be authorised to consent to registration of new company to be named "Tintex Dyes and Products, Ltd.," or such other name as may be available for registration, with nominal capital divided into shares of two shillings each, all of one class. Accounts to March 31, 1933, show gross profit of £7,005 (against £4,950) and a net loss of £876 (£5,901).

Bankruptcy Report

Re John Walter William Lester Pendleton.—Roman Bank, Skegness, Lincolnshire, late 81 Lumley Road, Skegness, chemist and druggist. The application for discharge herein was heard at Boston on July 20. The receiving order had been made in 1929. Debtor, in reply to questions, said that he had no intention of recommencing business. The judge granted the discharge, but suspended it for six months.

Pharmaceutical Society of Northern Ireland

Council Meeting

THE monthly meeting of the Council was held on July 21, the president (Mr. R. I. Edwards) in the chair. There were present also Messrs. J. C. Culbert, S. Gibson, Fred Storey, H. F. Moore, Horatio Todd, Sir Thomas McMullan and Dr. Fielden. Apologies for absence were received from Messrs. J. E. Connor, Wm. S. Taylor, G. W. T. McCann, J. F. Grimes, W. Martin, S. H. Forrest, Professor Small and Dr. S. E. A. Acheson. Mr. D. L. Kirkpatrick (secretary) was in attendance.

CORRESPONDENCE

The secretary of Queen's University forwarded the results of the Pharmaceutical Preliminary examinations: Brian C. Todd and Hugh K. Govan passed. Five obtained four subjects and five three subjects.

Mr. W. A. Magill, Ministry of Home Affairs, wrote acknowledging the Society's congratulations on the conferment upon him of the Imperial Service Medal by his Majesty the King.

It was reported that one candidate had sat at the recent examinations for the Fairchild scholarship and prizes.

MR. STOREY said it was a pity there were not more candidates.

The Ministry of Home Affairs forwarded a list showing the names of chemists (including limited companies) licensed during the period between the completion of the 1932 Register and June 30 last. The names numbered thirteen.

THE SECRETARY said the period was for three months, and there were six new pharmacies, one change of address and six changes in ownership.

TRAINING AND REGISTRATION OF APPRENTICES

Discussion took place on the question of the registration of apprentices outside Northern Ireland when the employer's name is on the Northern Ireland Register. The secretary had submitted the following questions to the Society's law advisers:—

(1) Has the registrar power to register any person who has passed the prescribed Preliminary examination, and who is serving his apprenticeship in the Irish Free State with a pharmaceutical chemist whose name appears on the Register of Pharmaceutical Chemists, Northern Ireland?

(2) Can the Pharmaceutical Society of Northern Ireland accept apprenticeship served in the Irish Free State after the passing of the Pharmacy and Poisons Act (Northern Ireland), 1925, provided the said apprenticeship was served with a pharmaceutical chemist who is registered as such in Northern Ireland?

(3) Can classes taken out in institutions in the Irish Free State be recognised for the Northern Ireland examinations under Schedule 2, Part IV, Part I and Schedule 2, Part IV, Part II?

The solicitors' reply, dated June 15, was as follows:—

Regarding the three queries which you sent us as to the registration of apprentices and the apprenticeship to be served, we beg to state that we have considered the matter very carefully, and, in our opinion, since the answer to the first query must be in the negative, the other two queries do not arise.

The first query is: "Has the registrar power to register any person who has passed the Preliminary examination prescribed by your Society and who is serving his apprenticeship in the Irish Free State with a pharmaceutical chemist whose name appears on the Register of Pharmaceutical Chemists, Northern Ireland?" In our opinion the registrar has no such power and any registration so made is invalid. We would refer you to Section 9 (1) which deals with the Registers which the registrar has to keep. Amongst others he has to keep a Register of Apprentices to Pharmaceutical Chemists *for* Northern Ireland and a Register of Apprentices to Pharmaceutical Chemists *in* Northern Ireland. It will be noticed the use of the word "for" in the first case, and the use of the word "in" in the second case. It seems obvious that the Register of Pharmaceutical Chemists for Northern Ireland may include persons who are not at the moment in business in Northern Ireland, but it is also clear that the Register of Apprentices is only to include the apprentices to pharmaceutical chemists in Northern Ireland.

In these circumstances we cannot see how the registrar has power to register as an apprentice any person who at the date of his application is not an apprentice to a pharmaceutical chemist in Northern Ireland, although such pharmaceutical chemist may be on the Register for Northern Ireland, which is an entirely different thing.

In view of this opinion, the queries as to whether the Society can accept apprenticeship served in the Irish Free State, or recognise classes taken out in institutions there, does not arise. This is so because Regulation 61 states that no period of apprenticeship shall be recognised except that served *after registration* as an apprentice under the Act. So that if there is no registration, the Society cannot consider the case at all.

In our view the whole matter is quite clear, but if the Council desires the opinion of counsel to be taken, this can easily be done.

Yours faithfully,
HAMILL, DAVISON & WILSON.

THE SECRETARY said the Home Office held a contrary view, namely, that the registrar had power to register apprentices who served outside Northern Ireland if their employer was on the Northern Ireland Register.

SIR THOMAS MCMULLAN said the point was a touchy one. The expression "registration of chemists for Northern Ireland" could include chemists who were not in Northern Ireland but were on the Register. A judge might take the same view as the counsel of the Home Office.

It was decided, on the motion of SIR THOMAS MCMULLAN, seconded by MR. STOREY, to get counsel's opinion on the points raised in the solicitor's letter.

THE SECRETARY said the Home Office had held that classes could be taken at anywhere under Section 2, Part IV, Part I and Section 2, Part IV, Part II. It was decided to get counsel's opinion on this also.

EDUCATION COMMITTEE

The Education Committee recommended that the certificate of apprentice to a pharmaceutical chemist be granted to the following:—Hugh Kennedy Gorman, 24 Loughview Terrace, Skegoniel Avenue, Belfast; Pharmaceutical Preliminary, Queen's University, Belfast. George Russell, Station House, Aldergrove, near Belfast; Preliminary, Royal College of Physicians and Surgeons. Christopher Boyd, 5 Crystal Terrace, Ballygomartin Road, Belfast.

The secretary drew the attention of the Committee to the following marks obtained by two students at the recent Preliminary Scientific examination:—A. Best (Lurgan) 522 marks, R. J. Taylor (Ballymoney) 510 marks, gold medal marks being 525. It was proposed, seconded and passed that the gold medal be awarded to Mr. A. Best and a book prize not exceeding 30s. in value to Mr. R. J. Taylor.

On the motion of MR. TODD, seconded by MR. CULBERT, the report was adopted.

THE JUNE EXAMINATIONS

THE SECRETARY reported the successes in the June examinations already published. In Section 2, Part IV, Part I, eighteen out of fifty-six passed. In the Final thirteen out of thirty-three passed.

THE PRESIDENT said that the country boys had also done well.

The examiners recommended a book prize in pharmacy for J. L. Kingscross and S. P. Linton, the latter as a re-examined candidate who had done exceptionally well. This was agreed.

THE PRESIDENT said that the results had been very good. There was one case of 100 per cent. in practical chemistry.

MR. STOREY said that in the past there had been complaints about chemistry, but the results now should ease their minds.

Mr. T. Harper and Dr. Fielden (pharmacy and practical pharmacy) reported:—

We beg to report that seventeen candidates (seven referred, ten new) attended both portions of above examinations during the week beginning June 19, 1933. Of the referred candidates, six passed and one failed in above subjects. Of the new candidates, two passed in above subjects and two failed; making the total pass in pharmacy ten. We are pleased to note that the standard in practical pharmacy continues to improve, one of the referred candidates obtaining 90 per cent., and one of the new candidates 85 per cent. in practical work.

Dr. Graham (chemistry, Part I and II) reported:—

Part I.—On the whole the answering in theory showed improvement on the former examinations held by me. The practical work, however, is still deplorably weak, only nineteen candidates scoring fifty marks and upwards out of a total entry of fifty-three.

Part II.—In this examination there was an all-round improvement in the answering, partly due, however, I think, to the fact that the papers were the easiest yet set by me.

Professor Small (botany) reported:—

Botany.—The standard in general was distinctly lower than last year, mainly on account of lack of precision and clearness. As shown by their answers to questions 1 and 6, few of the candidates had any clear knowledge of the different kinds of plant tissues, and no special knowledge of the structure of the male fern. In many cases growth was confused with germination, and again *Saccharomyces* was largely a vague type.

Pharmacognosy.—The general standard was reasonably good, with a falling off in the practical. As shown particularly by their answers to questions 1, 6 and 8, the candidates on the whole were not very familiar with the B.P., 1932, as distinguished from the B.P., 1914; and few of them showed that they knew the characters of the indigenous medicinal plants mentioned in the first question. The answers to the questions in the practical, which included powders, were on the whole very satisfactory.

Mr. R. H. Sloane (Final Part I physics) reported:—

Forty-two candidates sat the examination, and of these thirteen failed. The answering on the theoretical paper showed the students to have a fairly general knowledge of the course; the questions on light were, however, answered rather badly. In the practical examination many showed themselves to be good experimenters. Taking both theory and practical into account A. W. Kernahan obtained first place, W. R. Atkinson second and R. J. Taylor third place.

Messrs R. Walsh & Sons (business methods) said that the marks showed a percentage 64.2 in the written and 56.8 in the oral. Two candidates failed. They drew attention to the excellent answering of Victor Mills Wilson, who attained 93.7 in his written paper.

Members Elected

The following candidates were elected members of the Society:—John William McClatchie, Ardeen,. Portrush; Samuel Joseph Hamilton, 25 Eglinton Street, Belfast; Thomas Alexander Kane, 42 Albert Street, Belfast; Alfred Weller Mann, Donegall Square, North Belfast; Richard Bell, 126 Agnes Street, Belfast; William John Gracey, 106 York Street, Belfast; William Jones, 122 Thomas Street, Portadown; Alexander Walker, 118 Deramore Avenue, Belfast; Ernest Crawford, 34 Clifton Crescent, Belfast; Norman Miller, 317 Castlereagh Road, Belfast; James Anderson Brown, 2 Donegall Gardens, Belfast.

The Trade Press and World Recovery

An important discussion on "The Trade Press as an Agent in World Recovery" took place at the Advertising Exhibition at Olympia on July 20, following a luncheon organised by the Council of the Trade and Technical Press. The chair was occupied by Sir Gerald Chadwyck-Healey, Bart., C.B.E. (vice-president of the Council and chairman of Morgan Brothers (Publishers), Ltd.), and the principal speakers were his Excellency the Norwegian Minister (Mr. P. B. Vogt, G.C.V.O., LL.D.), and Dr. E. L. Burgin, M.P. (Parliamentary Secretary to the Board of Trade).

The Chairman, in a brief opening statement, expressed satisfaction at the presence of the Norwegian Minister, Dr. Burgin and many others holding important positions in industry and in the numerous associations and federations serving the trades and industries covered by the publications of the members of the Council. He claimed that the trade and technical journals of this country—the Cinderella of the Press—not only endeavoured to, but did, carry knowledge of the productions of our manufacturers into all parts of the world. Commenting on the close relationship which existed between the Department of Overseas Trade and the trade and technical Press, Sir Gerald said it would be a further assistance if Dr. Burgin could suggest any other way in which the important work of that Department could be added to. He also expressed the hope that the Norwegian Minister would be able to say how the trade and technical Press could help to make the trade agreement between Norway and this country a success, and, at the same time, tell them something of the activities of the trade Press in Norway. He added that in view of the immense importance and difficulties of "world recovery," as indicated by what had happened at the World Economic Conference, no stone should be left unturned to assist that great endeavour.

The Norwegian Minister said he could speak freely about the trade agreement because he had nothing to do with it. No business deal was a good deal unless it was satisfactory to both parties. The idea of a commercial treaty was that both countries should buy as much as possible from each other, and the trade agreement between this country and Norway was based on that principle. As regarded the trade Press in Norway, there were four principal trade papers, which all had sub-titles in English. One was printed entirely in English, another had a weekly number in English, and a third had a page in English in every issue; but, added the Minister, that was not done "for the sake of your blue eyes." It was done in order to sell as much as possible in Great Britain. Commenting on what the British trade Press could do further in Norway, his Excellency suggested that it could not do better than continue on its present lines, because there were hundreds of business men in Norway who read the English trade journals, and that fact had had an important influence in bringing about the present satisfactory state of affairs in the trade between the two countries, which was very evenly balanced. At the same time, he emphasised the need for catering for the different mentalities among the various populations. Finally, the Minister spoke hopefully of the future, mentioned how the railway receipts in this country had shown an upward tendency throughout the year and declared that that increase had nothing to do with artificial experiments carried out by people in foreign countries to bring about a recovery in world trade, a policy with which he did not agree. We must believe in ourselves and in the future; to quote an old Bulgarian saying, we should try to find out what we cannot do and then go and do it.

Dr. E. L. Burgin followed. He definitely stated that he spoke for his Department, whereas it is the almost invariable custom for Government representatives on such occasions to warn the audience that they are expressing their own views only. The key-note to the speech of the Parliamentary Secretary to the Board of Trade was that we have to acknowledge shortage to be a thing of the past; and the realisation of this fact makes some form of regulation of production, to vary with consumption, absolutely essential. That step, he added, would be an essential part of Government policy in the future. At the same time, he uttered a warning against pursuing such an ideal so vigorously as to produce an unnecessary and unnatural shortage. Governments, however, must not only consider the consumer element of their populations, but must have regard to the producers who, the

world over, were suffering bad times. Commenting on the various ways in which a rise in wholesale prices of commodities could be brought about, Dr. Burgin pointed out what a tremendous effect there would be on the level of wholesale prices if Germany were again an industrial country purchasing raw materials. For the moment, however, her stocks were virtually exhausted and she was not in the market to buy. If we could increase the demand for raw materials, the natural law expounded by John Stuart Mill would be far more effective than any artificial means for bringing about a rise in prices. To that end much could be done by intelligent advertising campaigns, which served not merely to call the attention of the public to the merits of a particular article but which also activated and stimulated consumption and demand, and provided information upon which there could be some sort of co-relation between demand and consumption on the one hand, and output and production on the other. The part played by the trade and technical paper in that connection was very hard to over-estimate. In the long run only exact knowledge was of use, and there was all the difference in the world between a journalist's account and the account of the technician or trade expert given in the specialised Press. No greater service could be effected to-day than by the trade paper intimating to those desiring to be acquainted with the trade which it served that the demand lay along certain lines or that production within particular limits was a possibility. If the main thesis that production and consumption must be related in order to avoid either scarcity or glut were granted, then the regulation of production, the stimulation of consumption and the mutual relationship of the two could be brought about by the trade and technical section of the Press, probably better than by any other means. Just as vast business concerns had floating insurance policies and accommodated the total risk insured in exact terms to the total risk they were bearing, so—he visualised—would a wise business carry with it some floating advertising cover and endeavour to adjust its advertising programme exactly to the need which it had for ensuring consumption, thus stimulating demand, ensuring production and keeping the manufacturing side continuously busy. Therefore he stressed the point that the use of advertising was not merely to sell in competition but to ascertain the measure of consumptive power in order to regulate production.

Mr. Holbrook Jackson expressed the view that the trade journals in this country had played too much into the hands of economists, probably taking a leaf out of the book of the popular Press, which frequently published articles advocating economy while at the same time the advertisements upon which they relied necessarily preached a diametrically opposite policy. Economy, pushed to its logical conclusion, would kill modern commerce, and a policy of legitimate extravagance should be advocated. The world at the present moment was suffering from the existence of the business men on the one side—who were very largely economic nationalists—and the bankers and currency dealers on the other side—who were economic or monetary internationalists—but the two systems could never mix. One would have to go by the board ; his own view was that there would, in the future, be more adjustment in currencies than in commerce. In trying to adjust production to consumption, as so many people did, the cart was being put before the horse. The thing to do was to increase the purchasing power of the people, and one of the first things to be done should be the restoration of the cuts in wages and salaries which had taken place. Finally, Mr. Jackson urged the necessity for Treasury Note printing to be handed back to the Treasury and taken away from the Bank of England in order that notes should be printed not against gold but against production and the power for consumption.

Sir Ernest Petter, after suggesting that more attention should be given by British trade and technical journals in placing information concerning British-made goods before foreign readers in their own language, expressed some regret that the trade and technical journals of this country should advertise foreign-made goods, as was often the case. As an English manufacturer he held the view that our technical Press, circulating abroad, should carry one message and one message only, namely, to show what was being done by British manufacturers. In many respects we were far too modest, yet our achievements in every branch of technical manufacture were unequalled, and his experience was that the complaints concerning British engineering products were that they were too good, too expensive, and too durable.

Commander Ellis (Imperial Chemical Industries, Ltd.) complained that in the case of some technical journals sufficient information was not given to advertisers concerning the nature and extent of the circulation, and added that a journal need not be afraid to say that its circulation was only 500 provided it went to the right people and covered the particular field. As representing an organisation which could make use probably of every technical and trade journal—but did not—he pleaded for greater frankness in regard to circulation and greater collaboration between the publishers of trade and technical journals and advertisers. As an instance of what could be done he said that the publishers of one group of papers recently changed the whole of the paper used in order to meet the convenience of I.C.I. advertisements.

Mr. Ely (Dunlop Rubber Co.), who asked for the name of the group of journals mentioned by Commander Ellis, also sought to impress upon the publishers of trade and technical journals that their advertisers were not obsessed with the stupendous circulation story. He also pleaded for closer touch between the advertisers and the publishers ; and while congratulating the trade and technical Press generally upon the improvement made in recent years, deprecated any attempt at turning them into a sort of jazzy imitation of general newspapers. The aim, he said, should be to keep in the closest possible touch with the industry represented, and not to express views in Editorials which were opposite to those expressed in the advertisements.

Mr. W. Alderson Smith, commenting on the suggestion that the trade and technical Press should keep in the closest possible touch with their industries, said that that result could only be achieved with the co-operation of the trade associations. So far as the electrical industry was concerned, he had endeavoured to come to an arrangement with a leading trade association whereby there should be regular conferences between the editors of the technical journals and the responsible officers of the association, a step which had been found so advantageous during the war. It was agreed that that course should be followed, but actually there was only one such conference and the scheme had dropped into disuse. He stressed the point that trade Press proprietors were only too anxious to help the trades they represented ; but although they spent a large sum of money in obtaining information, a great deal of valuable knowledge was in the hands of the trade associations, and when an endeavour was made to obtain it the door was usually closed.

Mr. Percival Marshall, proposing a vote of thanks to Sir Gerald Chadwyck-Healey for presiding, included in the vote of thanks Mr. Oliver Chadwyck-Healey (chairman of the Council) and Mr. Norton (secretary). In order to dispel any idea that the trade and technical Press of this country was of modern origin he recalled that the group of trade journals published by the chairman's firm (Morgan Brothers (Publishers), Ltd.) dated back to 1859, when The Chemist and Druggist and " The Ironmonger " were published. He believed that the other journal published by the chairman's firm, " The Engineer," went back a little earlier, and there were also present representatives of trade journals which had been in existence for as much as forty or fifty years, all of which were to-day displaying a freshness of outlook on modern problems and were as alive to the needs of industry to-day as they were half a century or more ago. It was perhaps not without significance that the chairman represented the first trade publishing house known in this country.

The vote of thanks was accorded with acclamation. The Chairman, acknowledging it, said that all the credit was due to those behind the scenes who had been responsible for organising the luncheon and the discussion.

BRITISH PHARMACEUTICAL CONFERENCE

The Chairman's Address

PHARMACY IN RETROSPECT AND PROSPECT

THE custom which has become established in recent times of holding the meeting of this Conference in London every ten years may be taken to provide the chairman, who is accorded the privilege and charged with the duty of delivering an opening address, with the occasion for a general review of pharmaceutical progress during the previous decade. It is well that sometimes we should take the opportunity to review progress made, to try to discern the general trend of pharmaceutical advancement and to contemplate the possibilities of future progress, as a traveller may pause awhile at a milestone to think upon the events which have chanced to him on the road which he has just travelled and to contemplate the possibilities of the road which lies before him.

C. H. HAMPSHIRE,
M.B., B.S. (Lond.), M.R.C.S., L.R.C.P., B.Sc. (Lond.), F.I.C., Ph.C.
CHAIRMAN OF THE BRITISH PHARMACEUTICAL CONFERENCE, 1933

To anyone who considers the progress of pharmacy some important scientific discoveries of recent times which have influenced the direction of pharmaceutical progress seem to stand out clearly. Science, in this generation, is reaping the benefit of the pioneering work and consequent rapid development which took place in the preceding generation. The advances in chemistry, bacteriology, microbiology, physiology and other sciences have not only given to the pharmacist greater knowledge of the materials which he has been accustomed to use and to produce, but have also added new classes of materials with which he must concern himself. It is necessary to mention, in the latter connection, only the antitoxins, serums and vaccines, the vitamins, the hormones and the chemical compounds having specific effects against the causative agents of particular diseases which are usually described as chemo-therapeutic substances.

On several occasions pronouncements from this chair and in other places have drawn attention to the trend of the changes which are taking place in medical treatment. It is a trend towards definitive curative treatment by means of specific agents of animal origin or produced by the resources of synthetic organic chemistry, and away from the use, often empirical, of vegetable or mineral drugs for the relief of symptoms. Medicine progresses from palliative and alleviative treatment to the preventive and curative measures which would constitute the ultimate ideal practice. Pharmacists will appreciate this noble ideal and will share in the desire to strive towards it. It must be expected that symptomatic treatment will still remain, though becoming of less and less importance as time goes on.

These considerations have been placed before pharmacists in a recent address by Sir Henry Dale, who has pointed out the necessity for pharmacy to qualify itself for new tasks, as medicine finds new and more rational methods.

From the practical point of view the most striking change is the reduction in the number of vegetable products used as drugs. Although some vegetable drugs continue to be used in very large quantities, the range becomes more and more restricted, largely as the result of pharmacological investigation. In the desire to find new therapeutic agents, the tendency is to turn not, as formerly, to the vegetable kingdom but to the laboratory.

The movement in medical treatment away from the use of vegetable drugs involves a corresponding lessening in the importance of the study of the plants which provide these drugs. This is reflected in the British Pharmacopœia, 1932, from which no less than sixty of the crude drugs contained in the British Pharmacopœia, 1914, have been excluded. Of these sixty, twenty-four are of interest principally in India or the Dominions and Colonies and were excluded on the understanding that Addenda dealing with the drugs specially applicable to India and the various parts of the Empire would be produced by the authorities of the states concerned. There are thus thirty-six vegetable drugs of general use which have been removed from the Pharmacopœia.

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The reasons for this severe cutting down of the number of vegetable drugs, as expressed in the Introduction to the Pharmacopœia, was the desire of the Commission to include only those substances which are of sufficient medicinal value to justify the continuance of their use by prescribers; also to reduce the number of drugs having similar active principles or which are employed for the same therapeutic purposes, for example, the astringents and purgatives.

The simplification which has taken place in the use of vegetable drugs is exemplified in the digitalis group. The late Professor Cushny, in his book on "Digitalis and its Allies" published in 1925, refers to no less than nineteen vegetable drugs which have been used in medicine at various times for their digitalis-like action. These include such drugs as lily of the valley, *Adonis vernalis*, hellebore, and erythrophlœum; the names of which evoke in me merely recollections of an occasional mention in prescriptions seen during apprenticeship days, although, I understand, some physicians still employ such drugs on occasion. Of these, three only are to be found now in most pharmacopœias, namely, digitalis, strophanthus and squill. In the British Pharmacopœia, 1932, squill is definitely disregarded as a heart drug and is not standardised from this point of view. Of the other two, digitalis is by far the most commonly used in medical practice, and nearly all the problems of pharmacological standardisation in this group have centred round this one drug. Strophanthus is regarded as of occasional value in cases where digitalis is not entirely suitable. The opinion has been widely expressed that similar simplification could be made in other groups of drugs with advantage.

This tendency in therapeutics makes it necessary to consider carefully the type of work for which the pharmacist of the future must be trained, and which he must be prepared to undertake. Much of the preoccupation with details of vegetable structure which has existed in the past has now become useless, and less attention should be devoted to the study of plants in order to allow for training in the knowledge of animal biology and physiology. It is clear that in future the pharmacist may be less of a botanist and must be more of a biologist.

If the pharmacist is to maintain his place as the trusted guardian of the purity of medicines and the provider of the requirements of the doctor, he must be trained in biological methods, in a knowledge of bacteriology and in the physiology of animal processes. The steps taken by the Pharmaceutical Society to adjust the education of the pharmacist to the changed basis of materia medica, and the facilities now afforded for the study of microbiology and of biological chemistry, will bear valuable fruit later, and the indications of changes in the educational requirements of pharmacists show great foresight.

The last ten years have seen the development of some new legal and administrative influences on the practice of pharmacy.

Therapeutic Substances Act

This Act was passed in 1925 to provide for the regulation of the manufacture, sale and importation of therapeutic substances, the purity or potency of which cannot be adequately tested by chemical means. The substances to which the Act applies include:—Vaccines, serums, toxins, antitoxins and antigens; insulin; pituitary (posterior lobe) extract; certain organic arsenical compounds; and sterilised ligature and suture material. In accordance with this Act an authority was set up under the Ministry of Health to make Regulations prescribing the standards and methods of biological testing to be applied to these substances. The duties of preparing and keeping standard materials and of carrying out control tests are entrusted to the National Institute of Medical Research. This Institute not only maintains the standards for this country, but has charge also of the International standards prepared in accordance with agreements reached by the Health Organisation of the League of Nations. It is scarcely necessary to point out the advantage of having a common unit and a common standard for all countries, in relation to important remedies such as insulin. The Institute has also undertaken, at the request of the General Medical Council, the charge of the standard materials required for the biological testing of digitalis and strophanthus and their preparations which are not included in the Therapeutic Substances Regulations, but are described in the British Pharmacopœia, 1932. The International Standards for vitamin testing are also kept at the Institute. The Therapeutic Substances Act applies to Great Britain and Northern Ireland; similar descriptions of most of the substances described in the Regulations are given in the British Pharmacopœia, in order to provide standards in other parts of the British Empire in which the Pharmacopœia is the legal authority.

The Permanent Commission on Biological Standardisation appointed by the Health Organisation of the League of Nations is another body which exercises indirectly an influence on pharmacy. The decisions of this Commission as to the general principles of standardisation, the drugs to be standardised, the units to be adopted and the standard material to be employed affect profoundly the materials which the pharmacist has to handle.

Other activities of the Health Organisation which may be mentioned as bearing on pharmacy are the Malaria Commission, which has defined standards for the preparation of the alkaloids of cinchona known as totaquina, and the Commission of Experts which is at present engaged in investigating the various processes for the assay of morphine in opium and its preparations, and of cocaine in coca leaves and crude cocaine, with a view to defining international standard methods.

Therapeutic Trials Committee

A new factor influencing the materials with which the pharmacist will have to deal is the Therapeutic Trials Committee, which was formed by the Medical Research Council in 1931. The object of this Committee is to supply manufacturers with clinical reports on new therapeutic agents which they are preparing to place on the market.

Anyone accustomed to read Continental medical and technical literature must notice the frequency with which pharmacological and clinical reports regarding the new products put out by private firms appear. In this country it is much more difficult, for reasons which are well understood, to secure for publication clinical reports on privately owned remedies, and the British manufacturer is consequently at a disadvantage. The Committee removes that disadvantage, and by reason of its impartial standing strengthens the claims of any remedy of which it approves. The Committee acts at the request of the manufacturer, who is required to submit with his product all available information regarding it. If the substance appears likely to be a useful remedy supplies are distributed to a number of clinicians in differents parts of the country, and in accordance with the reports received the manufacturer is advised whether the product is of value or not. If the remedy is approved the Committee supply clinical reports which the manufacturer may use for the purpose of introducing his product. On the other hand the Committee may refuse to deal with any product if the description and statements supplied by the manufacturers make it seem that the product is not likely to be worth investigating. In the event of a product being tried and reported upon unfavourably the manufacturer is advised not to proceed, and the Committee reserve the right to publish the reports. Dr. Chassar Moir's investigation upon ergotoxine ethanesulphonate and Dr. E. J. Wayne's clinical trials of digitalis glucosides are the only subjects, so far as I am aware, to be reported upon for publication up to the present. This does not represent, however, all the ground covered. It is in the nature of things that the best work done by such a Committee, that is, the investigations in relation to the drugs which eventually are reported upon unfavourably, will not be made public. I describe this as the best work, since a careful and comprehensive opinion

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on a product will benefit the public and the medical profession by keeping off the market valueless drugs which might otherwise be brought into use on insufficient evidence, and will save the manufacturer the expense and effort of launching an article which is destined ultimately to be unsuccessful. A good product, on the other hand, would be expected, in any case, eventually to gain acceptance, though the favourable report of an impartial Committee of a public body will be a great advantage to the British manufacturer in marketing his remedy.

The Therapeutic Trials Committee, however, does not initiate investigations of drugs already on the market. By contrast, the body in the United States which occupies a somewhat similar position, namely, the Council in Chemistry and Pharmacy of the American Medical Association, carries its activities much further in that any article which is introduced into medicine may be investigated and the claims made in the advertisements subjected to examination. Chemical investigations of new drugs are also made, and the results are embodied in reports which appear in " The Journal of the American Medical Association " and are reprinted in the annual volume of New and Non-official Remedies. The work of this Council was dealt with in some detail by Mr. Skinner in his address to the Conference last year, and I only refer to it now in order to point out its greater scope as compared with that of the Therapeutic Trials Committee.

The British Pharmacopœia, 1932

Another event of considerable interest to pharmacists which has happened during the last ten years is the formation of the Pharmacopœia Commission. It is unnecessary for me to review the circumstances which gave rise to the formation of the Commission ; it is sufficient to remind you that the recommendations of the Committee of Civil Research were accepted by the General Medical Council, and in 1929 the Commission came into being. Four years of intensive work resulted in the production of the British Pharmacopœia, 1932, in September last. In the intervening time the new Pharmacopœia has been thoroughly expounded and freely criticised, and there is little of a general character that I could say usefully in an address of this kind. Pharmacists have the satisfaction of knowing that they played a considerable part in the preparation of the official book of medicines, and they will, I am sure, loyally accept it.

The past decade seems to have been a period of unusual activity in pharmacopœial revision in many countries. As a matter of interest it may be recorded that the Pharmacopœias of the following countries have appeared:—Italy, 1928 ; Holland, 1926 ; United States, 1926 ; Belgium, 1930 ; Spain, 1933 ; Denmark, 1933 ; Roumania, 1928. The new Swiss Pharmacopœia is expected to appear shortly, and the Pharmacopœias of Austria and the United States are in active revision.

In 1930 the International Agreement for the unification of the pharmacopœial formulas for potent drugs, which had been in draft for some years, was made operative. In the British Pharmacopœia, 1932, the provisions of the Agreement are complied with as far as practice in this country allows, and it may be remarked that some of the most severe criticisms which have been passed upon the new Pharmacopœia refer to changes in certain formulas which were made in order to comply with the Agreement.

The next event of scientific and practical interest to pharmacy in this country, to which we are all looking forward, is the publication by the Pharmaceutical Society of the new British Pharmaceutical Codex. The book has been under revision for some years by a devoted band of workers, under the chairmanship of Mr. Herbert Skinner, who was chairman of this Conference last year, and the editorship of Mr. C. E. Corfield, our senior honorary secretary. From the preliminary survey of the drafts which I have been privileged to make it is abundantly clear that we may expect a Codex which will represent a considerable advance on its predecessors and will form a valuable supplementary volume to the British Pharmacopœia.

Turning to the consideration of the advances in knowledge in the branches of science which have a bearing on pharmacy, one is faced with an astonishing wealth of material. It is possible to mention here only a limited selection of the drugs and substances of pharmaceutical interest which have been the subject of research and to indicate the progress in our knowledge of them which has been made during the last decade.

The Ergot Problem

Ten years ago the position with respect to ergot appeared to be settled. It was accepted that the work of Barger, Carr and Dale had established ergotoxine as the alkaloid which gave to ergot its characteristic activity. At the meeting of this Conference held in London in 1923 Clark and Broom read a paper in which reference was made to their recently discovered method of standardising ergot on the uterus of the rabbit by reversal of the adrenaline action. In this paper the authors pointed out that the liquid extract of ergot and the infusion of ergot of the British Pharmacopœia, 1914, were practically devoid of alkaloids, while the ammoniated tincture of ergot and the solid extract contained small amounts only ; and they showed that the presence of acid in the menstruum used for extraction, as in the United States Pharmacopœia process, was necessary in order to extract the alkaloids. Following this, the impression that the liquid extract of ergot of the British Pharmacopœia, 1914, was useless was strengthened by repeated pronouncements on the lines of Broom and Clark's statement. It was generally thought that in order to secure an active liquid extract an acid menstruum must be used, and to secure uniformity a biological test based upon comparison with ergotoxine must be applied. The practising doctor, however, continued to use the liquid extract, apparently without concerning himself very much as to the method by which it was prepared.

Various suggestions for chemical standardisation were made from time to time, and the most promising test appeared to be that first described by Van Urk, in which the colour produced by the action of para-dimethylaminobenzaldehyde upon ergotoxine in the presence of acid was utilised. This test was elaborated and improved by M. I. Smith in America, and was made the subject of a careful investigation by the Ergot Subcommittee of the Pharmacopœia Commission. As a result of the labours of this subcommittee a chemical method of standardising ergot by means of this reagent was introduced into the British Pharmacopœia, 1932. The value of this test rests upon the statement that ergotoxine is the active alkaloid. Actually the accompanying alkaloid, ergotinine, which pharmacologically is relatively inert, gives the same colour as ergotoxine, but the test is applicable on the assumption, for which there is some experimental support, that ergotinine and ergotoxine occur in ergot in constant proportions.

A liquid extract of ergot prepared from defatted ergot by means of an alcoholic menstruum containing tartaric acid, and standardised by this colour test, was included in the new Pharmacopœia, the requirements for alkaloidal strength being adjusted to allow for the known instability of such an extract on storage. Ergot which has been deprived of its fat is known to be stable for long periods, and powdered defatted ergot, standardised by means of the chemical test, was included in the Pharmacopœia under the name Ergota Præparata, in the expectation that it would in time replace the unstable liquid extract. It was shown by Burn that when such a preparation is taken by the mouth ergotoxine is absorbed into the circulation.

Ergotoxine ethanesulphonate was also included in the Pharmacopœia to provide a suitable salt for injection when a rapid effect is desired. This salt was formerly the subject of a patent and its inclusion was made possible only by the public-spirited action of the owners of the patent, Messrs. Burroughs Wellcome & Co., in resigning their patent rights.

On the eve of the publication of the British Pharmacopœia, 1932, Chassar Moir published some observations

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on the effect of ergot in human patients. These observations were made by a new method of graphical recording of the uterine contractions, and revealed some striking and unexpected results. Moir stated that the effect of ergot when taken by the mouth was to induce with remarkable rapidity strong uterine contractions, which, however, lasted only for a limited time. This was in contrast to the known effect of ergotoxine, the effect of which is much slower in beginning and lasts for a much longer time. Moir concluded that there must be in ergot some principle not previously identified. Tests of ergot preparations of the British Pharmacopœia, 1914, by this method showed them to possess the activity ascribed to this unknown constituent. Fortunately the liquid extract of the British Pharmacopœia, 1932, was also found to possess this effect in about the same degree.

The next step should be the separation and identification of the principle to which the action demonstrated by Moir is due. A decision is then required from the clinician as to the type of action for which ergot is to be used. Is the action to be quick in inception and comparatively short in duration, or is the effect desired that of ergotoxine, which is slower in beginning and longer in duration? With these questions answered and the basis of standardisation settled it should then be possible to place the chemical assay of ergot on a sound basis. Meanwhile the preparations of the Pharmacopœia provide the means of administering ergot in forms which have been standardised with respect to ergotoxine, a substance which has a definite action, and the position is thus considerably advanced as compared with that of ten years ago.

The question whether the alkaloid ergotamine described by Stoll is identical or not with ergotoxine has been the subject of some controversy. It appears to be generally accepted now in this country that the two alkaloids have the same pharmacological action, and Moir has shown that they are indistinguishable from one another in their action on the puerperal uterus. On the chemical side Smith and Timmis have found differences in the properties of the two alkaloids which indicate that they are distinct substances. These authors found also that, although ergotamine is a constituent of the ergot of *Festuca*, it could not be obtained from ergot of rye.

The Digitalis Problem

The problem of providing accurately standardised and stable preparations for the administration of digitalis has been the subject of much research, and a successful issue appears to have been reached so far as this is possible by the use of the leaves of *Digitalis purpurea*. This satisfactory position is due in considerable measure to the series of researches which have been conducted in the Pharmacological Laboratories of the Pharmaceutical Society. An international standard powder has been prepared and is kept at the National Institute for Medical Research. The International Unit of activity is defined as the amount of activity contained in 0.1 gram of this standard powder. According to the new Pharmacopœia, digitalis and its preparations are assayed by comparison with a standard preparation, and any suitable method of comparison may be used so long as the standard deviation of the result ascertained from a large number of preparations is not greater than 10 per cent. Two methods, one employing the frog and the other the cat or guinea-pig, are selected for description. The Pharmacopœia includes a standardised powdered leaf, Digitalis Pulverata, a standardised tincture and a fresh infusion made from the standardised leaf. The potency of these preparations is expressed in the International Units, and it is hoped that the prescribing of these drugs by means of units rather than by volume or weight of the preparation will, in time, become general.

We have thus in the Pharmacopœia standardised forms of the preparations of digitalis ordinarily used by the physician for administration by the mouth. The question of providing a preparation for injection is much more difficult. The injection of the Dutch Pharmacopœia has been tried clinically with unsatisfactory results, and it is well known that many of the substances sold as the active principles of digitalis are mixtures of indefinite composition. In these circumstances, when the administration of a drug of the digitalis group by injection is required, the physician ordinarily has recourse to strophanthin. This is now described in the Pharmacopœia as a mixture of glucosides obtained from *Strophanthus kombé*, and the potency is adjusted in accordance with a biological test to be 40 per cent. of that of anhydrous ouabain. In addition the Pharmacopœia retains tincture of strophanthus, which is now standardised by comparison with a standard tincture which is kept at the National Institute for Medical Research.

Pharmacists, by reason of their chemical training, may be expected to have a preference for standardisation by chemical means. It is not possible, however, to record any satisfactory progress in this direction in the digitalis group. Various attempts at standardising digitalis preparations by colorimetric methods have been made, but it is found that the results obtained are not in accord with those of biological methods. In recent years several methods of determining small quantities of sugars in blood have been developed in connection with the investigation and treatment of diabetes. It is possible that a method for the determination of the active glucosides in digitalis and its preparations could be worked out on the basis of hydrolysing the glucosides and determining the sugar produced.

Investigations of other species of *Digitalis* have proved of great interest. The leaves of *D. lanata* have been found to possess a high degree of physiological activity, and Wokes has shown that they may have a potency as much as three and a half to four times that of the international standard powder. S. Smith, in the course of an examination of the glucosides of this species, has isolated a new glucoside which promises to be a very valuable therapeutic agent. This substance, which has been named digoxin, was obtained in colourless crystalline plates melting at about 265°, and has the formula $C_{41}H_{64}O_{14}$. It is almost insoluble in water, chloroform, ethyl acetate and acetone, but dissolves in alcohol. It is distinguished from gitoxin, the glucoside which, among those already known, it most resembles, by its greater solubility in 80 per cent. alcohol and by the olive-brown colour which it gives when dissolved in acetic acid containing a trace of ferric chloride and treated with sulphuric acid. Digoxin is optically active and yields on hydrolysis, which takes place readily, digitose and a crystalline genin. One milligram of digoxin has been found to possess activity, as measured by the frog method, equivalent to 0.28 milligram of standard ouabain.

Digoxin has been investigated clinically on cases of auricular fibrillation, for the Therapeutic Trials Committee by Dr. E. J. Wayne, at University College Hospital. A report will be found in this month's issue of "Clinical Science," and I am indebted to Sir Thomas Lewis and Dr. Wayne for the privilege of reading an advance copy of this report. Dr. Wayne shows that, when given by mouth or intravenously, digoxin rapidly produces the effect for which digitalis is given. There is a rapid fall in the ventricular rate, and, in cases with cardiac failure, the degree of congestion diminishes, and if œdema is present diuresis occurs. It is more rapidly absorbed and eliminated than digitalis. For intravenous injection a solution in 80-per-cent. alcohol containing 0.5 milligram per c.c. was made, and this was diluted at the time of using with nine times its volume of sterile normal saline solution, thus producing an injection containing 8 per cent. of alcohol. The glucoside, like other digitalis preparations, is irritant to the tissues. For oral administration the alcoholic solution is freshly diluted with water or chloroform water. The doses given were, by mouth 1.0 to 1.5 mgm., intravenously 0.75 to 1.0 mgm.

The discovery of digoxin promises to go far towards the complete solution of the digitalis problem. It has many advantages over digitalis and has no disadvantage, such as the production of vomiting, which does

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not apply with equal or greater force to digitalis. It is a pure crystalline substance which can be characterised by chemical and physical tests. Physiological assay, with the expenditure of time and money and the relatively large margin of error which it involves, is thus rendered unnecessary. It acts promptly when taken by the mouth, and for intravenous injection it offers a definite substance which may well replace the indefinite mixture, strophanthin, which requires physiological standardisation.

The same report describes a clinical investigation of a second glucoside, Digitalinum Verum, which has been prepared in a chemically pure form by Smith and Grant. This is a constituent of the digitalin obtained from the seeds of *Digitalis purpurea*. These workers have found that the purest digitalin previously obtained consists of the pure substance, which they have now produced, mixed with four other glucosides. Digitalinum verum is more soluble than digoxin in dilute alcohol. For oral administration a solvent containing 1 mgm. in 1 c.c. of 9-per-cent. alcohol was used and for intravenous injection a solution containing 5 mgm. in 10 c.c. of 9-per-cent. alcohol. 2.5 mgm. of digitalinum verum was found to be equivalent to 1 c.c. of tincture of digitalis when tested on the frog in comparison with the international standard digitalis. In the cat 1 mgm. had the same effect as 0.1 gram of standard ouabain or 1 c.c. of standard tincture of digitalis.

It was found that, when given by the mouth, digitalinum verum had no effect on the ventricular rate, but produced gastro-intestinal symptoms. When given by intravenous injection 5 mgm. of the glucoside produces a reduction in the ventricular rate of almost the same magnitude as that produced by 1 mgm. of digoxin. Digitalinum verum thus promises to be a useful drug for intravenous injection when rapid action is desired. It has the advantage over digoxin that it is more readily soluble in alcohol, but, on the other hand, it must be given in larger doses to produce the same effect.

Vitamins

Ten years ago the conception of accessory factors in nutrition which was brought forward by Hopkins in 1912 had attained general acceptance. The effects of different factors, or vitamins as they came to be called, had been differentiated and a considerable volume of experimental fact had been accumulated relative to the factors now familiar as vitamins A, B, C, and D. In the intervening decade an enormous amount of experimental work has been done in this field, with results which rank among the most impressive achievements of scientific research. Any attempt to set out here the present position of vitamins fully in all their biological, chemical and therapeutic aspects is, of course, out of the question. I shall only endeavour to bring to your notice some of the outstanding points in relation to two aspects of this subject which should be of special interest to pharmacists, viz., standardisation and chemical composition.

The question of standardisation has been dealt with by the Health Organisation of the League of Nations, and it has been possible to make standard preparations and to recommend units for vitamins A, B, C, and D.

Vitamin A is a fat-soluble substance, occurring in the livers of mammals and of fish, which is necessary to normal growth in animals. In the absence of a sufficient amount xerophthalmia may develop and there is a general loss of resistance to disease. It is closely related chemically to the vegetable colouring matter carotene, $C_{40}H_{56}$. Carotene has been recommended as the international standard, and the unit of vitamin A activity is defined as that of 1γ (0.001 milligram) of this substance, the test being made by comparison on young rats. The study of this vitamin has been greatly facilitated by the development of the colour test with antimony trichloride and by the study of the absorption spectra of oils. In the antimony trichloride test a blue colour is produced by the action of a chloroformic solution of antimony trichloride upon a chloroformic solution of a liver oil containing vitamin A. There has been some controversy on the point whether the depth of colour produced is proportional to the content of vitamin A, but it is now generally accepted that, though there may be in the oils as ordinarily used certain substances which interfere with the accuracy of such a measurement, a quantitative relationship between vitamin A and colour value exists in the unsaponifiable matter which has been separated from the oils. When the unsaponifiable matter is separated from fish-liver oils, the vitamin is concentrated in that fraction. A standard form of the test was worked out by a Subcommittee of the Pharmacopœia Commission, and the British Pharmacopœia, 1932, now contains a standard of blue value, which corresponds to not less than 6 for cod-liver oil. With regard to the second line of work, the spectrographic examination of oils, it has been shown that the intensity of the absorption band which has a maximum at the wave-length of 328 mμ is proportional to the biological activity, and this method is now regarded as the most accurate measure of the vitamin A content of oils.

Although cod-liver oil is the traditional agent for the administration of fat-soluble vitamins, halibut-liver oil has been found to be a far richer source of vitamin A. By fractionation of the unsaponifiable matter of halibut oil under high vacuum, preparations showing extremely high vitamin A content have been obtained. Carr and Jewell have recently obtained a fraction having an antimony trichloride blue value of 78,000 and a spectrographic intensity for the band 328 mμ of 1600. These results suggest that something closely approaching pure vitamin A has been isolated.

Vitamin B.—It is now recognised that the materials which were regarded as containing this water-soluble vitamin really contain a number of substances which have a profound influence on nutrition. No less than six, which are frequently referred to as the vitamin B complex, have been recognised as constituents of such substances as yeast and wheat embryo. They present differences in their actions but are conveniently grouped together because of their occurrence in the same type of substances.

Vitamin B_1, the anti-neuritic or anti-beri-beri vitamin, was one of the earliest to be recognised. It is necessary to normal growth in the rat ; a deficiency in the diet of man leads to the disease known as beri-beri, and a deficiency in the diet of rats, dogs and pigeons leads to polyneuritis. Much work has been done with a view to the elucidation of the chemistry of this vitamin. Crystals having the characteristic biological activity have been isolated by various workers, but the chemical constitution has not been fully worked out. The difficulty has been, with this substance as with other vitamins, that of determining whether the activity of the substance isolated is a property of that substance or of some small content of an associated substance. The vitamin is decomposed by alkalis but is relatively stable in the presence of acid. It is now agreed that the crystalline vitamin contains sulphur as well as carbon, hydrogen, oxygen, and nitrogen, and it is usually regarded as a base. The international standard recommended is an absorption product on fuller's earth, obtained from rice husks by a specified method. The unit is the antineuritic activity of 10 milligrams of this preparation. This preparation has been found to be stable for a year, and it contains small proportions of vitamins B_2 and B_4.

Vitamin B_2, the anti-pellagra vitamin, is necessary to normal growth. A deficiency produces in man the disease known as pellagra and in rats and dogs abnormal conditions of the skin and other tissues. It is not decomposed by acids, is moderately stable to alkalis, and in neutral solution is not affected by heat. Concentrates of this vitamin have been prepared, but little more of the chemistry of the substance is known than that it is probably a neutral substance having a molecular weight higher than that of B_1.

Vitamin B_3 is necessary for the growth of pigeons. It is unstable on heating, but little or nothing is known about its chemistry.

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Vitamin B_4 is necessary for the growth of rats and pigeons, and a deficiency causes certain nervous symptoms in rats. A crystalline compound which is unstable in the presence of alkalis, and has the characteristic activity of this vitamin, has been prepared and has been assigned the formula $C_4H_4N_5Cl$.

Vitamins B_5 and B_6 have been differentiated. They are stable to heat and have special actions in the nutrition of rats.

Vitamin C, the anti-scorbutic vitamin, is a water-soluble substance occurring in the juice of the orange, lemon and other fruits, and in many vegetables. It is unstable to heat and is readily oxidised. The process of preparing concentrated preparations has been the subject of much research. The recent work on the chemistry of this vitamin has centred round the discovery that a hexuronic acid isolated from lemon juice and also from the suprarenal glands of the ox possessed the characteristic properties of vitamin C. More recently a highly active anti-scorbutic substance related to the hexuronic acids, but differing in containing a molecule of water less, has been isolated and named ascorbic acid. Ascorbic acid is soluble in water and has strong reducing properties. It has now been obtained in quantity from the fruits of *Capsicum annum,* and is a constituent of the suprarenal cortex. It may be expected that the elucidation of the constitution of this substance and its synthesis will not be long delayed. Last year a mild sensation was created by the report by two Norwegian workers that vitamin C had been isolated and proved to be a derivative of narcotine. Attempts to repeat these results by other workers have been unsuccessful.

The international substance recommended for use in the standardisation of vitamin C preparations is fresh lemon juice, the unit being defined as the vitamin C activity contained in 0.1 c.c. The test depends upon the prevention of the appearance of scorbutic lesions on guinea pigs maintained on a scurvy producing diet.

Vitamin D, the fat-soluble antirachitic vitamin, attracted attention early in the development of the subject of accessory factors by reason of its occurrence in cod-liver oil, the typical antirachitic remedy. The principal advances in relation to vitamin D arose from the discovery that this material could be produced synthetically. The occurrence of this substance in a large variety of materials has been the subject of wide investigations, and the biological methods of determination have been brought to a high degree of development as the result of very extensive researches. The principal appeal to us, however, will be made by the discoveries on the chemical side. Two fundamental facts in relation to the chemistry of vitamin D were the discovery that sunlight or ultra-violet light brings about a cure of rickets and that antirachitic properties could be produced in fatty foods of various kinds by exposure to ultra-violet rays. The nature of the change taking place in food materials when thus irradiated was naturally a subject of great interest. The simplest explanation assumed the presence in these materials of a substance which was changed by the chemical action of the rays into vitamin D. This substance was eventually identified as ergosterol, a sterol having the formula $C_{28}H_{41}O$, which is a constituent of yeast, of ergot and of many fatty foods. Ergosterol is a constituent of the skin, and many of the benefits of exposure of the skin to sunlight are consequent upon the conversion of ergosterol into vitamin D and the absorption of the vitamin into the system. The constitution of ergosterol is not yet fully worked out, but some progress has been made and a number of derivatives and isomers have been isolated. The principal interest centres round the methods of irradiation, which have now been developed to the extent that it was found possible to include in the British Pharmacopœia, 1932, under the name Liquor Ergosterolis Irradiati, a solution in oil of an antirachitic principle, probably identical with the vitamin D in cod-liver oil. The solution is standardised by a biological method to contain in 1 gram 3,000 units of antirachitic activity. The Pharmacopœia accepts the international unit and suggests procedures for carrying out a curative or a prophylactic method of assay, either of which may be used. In the earlier drafts of the Pharmacopœia, the preparation by irradiation of a solution of purified ergosterol in oil was described, but shortly before the Pharmacopœia was completed the isolation of pure vitamin D was announced and it was possible to make the monograph in the completed Pharmacopœia include the alternative method of preparing the solution by dissolving the purified antirachitic principle in the vehicle. The actual vitamin D, which has been named calciferol, was isolated as the result of a series of researches by a team of workers at the National Institute for Medical Research. It may be obtained in the form of its 3:5-dinitrobenzoate either from the crystalline material which irradiated ergosterol yields on fractional sublimation at low pressures, or directly from the irradiation product of ergosterol. The active substance was also isolated almost at the same time by Windaus in Germany. Calciferol is now a commercial article prepared by the process worked out at the National Institute for Medical Research. In this process ergosterol is irradiated in an organic solvent, the solvent and unchanged ergosterol are removed and the so-called active resin which remains is esterified with dinitrobenzoyl chloride. The dinitrobenzoate on hydrolysis yields calciferol, which is considered to be an isomer, and probably a stereoisomer, of ergosterol but without water of crystallisation. When pure it is perfectly white, but quickly turns yellow and ultimately brown in contact with air, more especially if powdered or heated. The melting point, optical rotation data, colour reactions and other chemical and physical properties have been fully worked out. The biological activity is not less than 40,000,000 units per gram. The international standard recommended for the assay of vitamin D is the standard solution of irradiated ergosterol issued from the National Institute for Medical Research and the unit is the activity of 1 milligram of this solution.

Vitamin E has been differentiated as a fat-soluble substance which is necessary to reproduction in experimental animals. It occurs in wheat-germ and its oil and in green vegetables ; small amounts are present in butter and vegetable oils.

Animal Substances

The Pituitary Body.—The standardisation of the liquid extract of the posterior lobe of the pituitary body has been worked out and standards are included in the Therapeutic Substances Act and in the British Pharmacopœia, 1932. An outstanding advance in relation to this product was made in 1928 by Kamm and his colleagues, who discovered processes by which the oxytocic and pressor activities could be separated. The possibility of using the one without the other has been of great help in medical treatment.

Knowledge of the chemistry of the hormones of the pituitary body has not advanced very far. They are rapidly extracted by heating with very dilute acid, but long heating in acid solution destroys them and they are rapidly destroyed also by alkalis. They are not soluble in organic solvents but may be separated from aqueous solution by salting out with ammonium sulphate. The standard of the British Pharmacopœia is based on the measurement of the oxytocic effect only, but the Therapeutic Substances Act permits of the standardisation of products separately for either pressor or oxytocic effect.

The third action of posterior pituitary, the antidiuretic effect which makes the drug so valuable in cases of diabetes insipidus, is probably due to a third distinct hormone. It has been said that the antidiuretic effect accompanies the pressor effect. Wokes has shown that the determination of oxytocic effect is not a safe basis of assay for the antidiuretic effect. A method of determining antidiuretic potency by means of the action on rats has been devised by Burn.

The anterior lobe of the pituitary body has been the subject of much investigation and three effects of its administration are now described, viz., stimulation of the ovary so as to cause rapid growth of the follicles, stimu-

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lation of the formation of corpora lutea, and the promotion of bodily growth. The first two activities are due to a principle called prolan which may also be obtained from the urine of pregnant women. It is believed that the two activities are due to two distinct hormones, which have been named respectively, prolan A and prolan B. Very little is known as to the chemistry of these hormones.

Thyroid.—The isolation of thyroxine and its synthesis by Harington have placed the use of this animal product on a very satisfactory basis. Assay processes have been worked out which enable a standardised powdered defatted gland containing a definite proportion of thyroxine to be included in the British Pharmacopœia, 1932. The Pharmacopœia also includes the sodium derivative of thyroxine in order to provide a means of administering this substance by injection.

Insulin.—Ten years ago insulin was a recent discovery in therapeutics. Mr. Gamble, in his address to this Conference, gave considerable attention to this active principle of the pancreas which seemed to promise such splendidly hopeful results in the treatment of diabetes mellitus. It may be said at once that the hopes then entertained have been amply realised. The increased understanding of diabetes and the success in its treatment form a very encouraging story, and lead to the greatest possible hopes of the future of medical research. On the chemical side, insulin has now been isolated in the pure crystalline form, and it is recognised to be a highly complex protein compound having a molecular weight of at least 10,000. The molecule can be broken down with the production of a number of amino-acids and the presence of alcohol groups has been demonstrated. Standards for the potency of insulin and methods for its assay are provided by the Therapeutic Substances Act and the British Pharmacopœia, 1932. Insulin is effective only when given by injection, and it was inevitable that when interest in the subject of diabetes was stimulated attempts should be made to find drugs which would be active when given by the mouth. A number of vegetable drugs, such as *Vinca rosea,* which had formerly enjoyed some reputation for use in glycosuria, were tried but with unsuccessful results. The most promising materials for this purpose were two guanidine derivatives which were introduced under the names synthalin and glukhorment. These were investigated, and although it was found that when given by the mouth they had some effect in reducing blood sugar, the results were too uncertain to enable the drugs to be used as substitutes for insulin.

Liver Extract.—Another outstanding discovery of medical science, ranking almost as high as the treatment of diabetes by insulin, is the curative effect of liver in pernicious anæmia. At first, raw or lightly cooked liver was administered, but it was not long before the chemist and the pharmacist found it possible to produce a potent extract which could be given in concentrated form. A standard process was worked out at the National Institute for Medical Research and an extract of liver prepared on the same lines has been included in the British Pharmacopœia, 1932. A liquid extract of liver is also included, and it is possible now to treat pernicious anæmia by means of relatively small quantities of a solid or a liquid and so to save the patient from the somewhat distasteful necessity of consuming large quantities of the liver itself. Although liver is efficacious in pernicious anæmia when taken by the mouth, it is becoming more and more evident that to get rapid and uniform results the active material should be given by injection. Many trials have been made to utilise liver extracts in the treatment of secondary anæmia, but the results in these cases have been less encouraging, although there is some reason for believing that liver extract is of value. Liver extracts have been shown to contain considerable quantities of Vitamins B1 and B2. Preparations, preferably defatted, of the stomachs of animals have similar properties, and serve as adjuncts in this treatment of pernicious anæmia.

Suprarenal Gland.—Adrenaline, the hormone obtained from the suprarenal medulla, has long been known as a pure crystalline compound. Its chemical constitution is understood and the laevo-compound obtained by synthesis is now recognised by the British Pharmacopœia, 1932, in addition to the natural substance.

The suprarenal cortex has been the subject of much research with results which are of great interest. Quite recently the hormone which is active in the treatment of Addison's disease, has been prepared in solution, by extracting the gland substance with alcohol and precipitating other material from this solution by means of various organic solvents. An aqueous solution is obtained which, when injected into animals in which Addison's disease has been simulated by the removal of the suprarenal glands, prolongs their life for a considerable period. Good results have been obtained in some cases of Addison's disease by the use of this injection.

Parathyroid.—Parathyroid gland contains two hormones, one controlling the concentration of calcium in the blood, the other having a growth-retarding effect. The calcium-regulating hormone is readily obtained in a form suitable for injection and when injected increases the proportion of calcium in the blood. It is useful in the treatment of conditions of parathyroid deficiency or calcium deficiency. Standardisation of the preparations of parathyroid in respect of the calcium-regulating factor may be made by determinations of the increase in the proportion of calcium in the blood of dogs or the quantity of calcium excreted in the urine of rats which results from the injection of the preparation.

The Sex Hormones.—Many researches have been made in recent years on the occurrence of hormones which produce oestrus, and as a result considerable knowledge of the chemistry of the active hormones has been gathered. Two main substances are described, keto-hydroxy-œstrin, a white crystalline solid, melting at 254° C., and having the empirical formula $C_{18}H_{22}O_2$, and the closely allied trihydroxy-œstrin. These substances, which may be obtained from the urine of pregnant animals, have been tried in the indefinite and difficult group of maladies with which the gynæcologist has to deal and their position as remedies must perhaps be left undecided for the present. It is significant, however, that the Permanent Commission on Biological Standardisation has thought it worth while to set up an international standard and to define an international unit. The standard is a quantity of keto-hydroxy-œstrin kept at the National Institute for Medical Research and the unit of activity is defined as the specific oestrus-producing activity contained in 0.0001 mgm. of this standard preparation. It is interesting also to note the relation of these hormones, which have seemed hitherto to be typically animal products, to the vegetable kingdom. Oestrus-producing preparations have been made from germinating grain, and also from peat, coal, petroleum and bituminous material. The hormone has been shown also to influence the growth of certain plants, including hyacinths and lilies of the valley, which come to flower more quickly when small quantities of sex hormone are supplied to them. Of great interest also is the recent discovery that auxin, a plant growth-promoting hormone isolated from the heads of the shoots of maize or barley, occurs in the urine of warm-blooded animals. The male sex hormone has also been isolated and has been assigned the formula $C_{16}H_{26}O_2$. It is an oxyketone and a secondary alcohol.

Modes of Administration.—It is now generally appreciated in order to get therapeutic results most of the animal substances whose effects depend upon the presence of hormones must be given by injection. The outstanding exception to this statement is thyroid, which is effective when given by the mouth, although in certain instances it is of advantage to be able to administer the active principle, thyroxine, by injection. It is claimed also that keto-hydroxy-œstrin is effective when given by the mouth.

It is true that there is some evidence to show that limited quantities of adrenaline can be absorbed when suprarenal gland is given by the mouth to patients who have a deficiency of adrenaline, as, for instance, in cases of Addison's disease, and it is possible that when other dried glands are given by the mouth some hormone may

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be absorbed if the body is badly in need of it. The quantity, however, which might be expected to be so absorbed is, of course, very definite, and for therapeutic purposes the injection route is practically essential. It is possible that therapeutic advance in this field has been delayed by the premature use of gland products by the mouth, especially in the form of "omnibus" tablets. This is, no doubt, a convenient form for the pharmacist, but all the research work on the isolation and differentiation of active principles seems to indicate that the injection route will be required more and more as the subject is worked out. Insulin and most other hormones are destroyed in the alimentary canal, or are not absorbed from it. This circumstance should not occasion surprise, since the animal body elaborates these substances for distribution by the bloodstream; they are not intended normally to stand the treatment to which they are subjected in that curious chemical laboratory, the human stomach. Much has been said and written of late on the subject of sterilisation, and this is one of the many reasons for the pharmacist to direct his attention to acquiring skill in the preparation of sterilised solutions for injection.

I shall make no attempt to review the subject of antitoxins, serums and vaccines. These materials pass through the pharmacist's hands, and the skilled operations and technique necessary in their preparation provide a proper field for the pharmacist's activities. They should, therefore, be, for him, a subject for close study. Some of these products are now described in the British Pharmacopœia, and with advancing medical knowledge, more and more diseases should come to be treated by specific remedies of this kind.

New Drugs

The more important of the new drugs of animal origin have been already mentioned.

Synthetic Remedies.—The multiplication of synthetic organic drugs has gone on during the past ten years to a surprising extent. The comparative ease with which the substituting groups in an organic nucleus can be varied by chemical processes is well-known. Variants upon a drug which has been found useful are readily prepared by well-understood methods and are put forward for use in therapeutics in the hope that they may possess advantages or freedom from disadvantages which will merit their use. In the barbital group these activities have been especially notable. Of the large number of drugs of this group which have been introduced from time to time, the British Pharmacopœia, 1932, includes only four, all well tried and established therapeutic agents, barbitone, phenobarbitone and their water-soluble sodium compounds.

In the group of synthetic local anæsthetics, a large number of substances have been prepared and investigated. Of these the British Pharmacopœia, 1932, describes only four, amylocaine hydrochloride, benzocaine, orthocaine and procaine hydrochloride. With one or other of these agents, used either alone or in combination with adrenaline, most of the purposes for which cocaine has proved so valuable can be fulfilled. One property of cocaine, however, has not been found among these substances, namely, the production of contraction and retraction of mucous membranes, which is so valuable in the work of the rhino-laryngologist. In this respect at least the perfect substitute for cocaine has not yet been discovered.

Some activity has been shown in the production of substituted derivatives of the opium alkaloids. The endeavour to modify the actions of morphine and to increase the margin between effective dose and toxic dose has resulted in the introduction of some new products. Dilaudid, the hydrochloride of dihydromorphine, dicodid, the bitartrate of dihydrocodeinone, and eukodol, the hydrochloride of dihydro-oxycodeinone, have been put forward as substitutes for morphine, and claims have been made for them as analgesic and respiratory sedatives. Dilaudid especially has been recommended as being relatively non-toxic and free from habit-forming properties. This drug was recently the subject of a report by the Council of Pharmacy and Chemistry of the American Medical Association. As a result of extensive clinical trials it was concluded that dilaudid is a powerful analgesic, and like morphine can depress the respiratory mechanism profoundly. The ratio between the therapeutic and toxic doses is not materially different from the ratio in the case of morphine. Dilaudid was not found to be free from tolerance and addiction-evoking properties, and while gastro-intestinal disturbances were less frequent than with morphine the "prolonged administration of dilaudid should be entered upon with as much caution as would be exercised with morphine itself."

All three drugs have recently been investigated by Myers at the Cambridge Pharmacological Laboratory, and his results show that the pharmacological actions of dilaudid, dicodid and eukodol are very similar to morphine but appear to be much more toxic, especially in the depressant effect upon respiration. The conclusion drawn from the investigation is that there is no reason to think that any of these drugs are superior from a therapeutic point of view to morphine.

I mention these instances as illustrative of the disappointing results which may follow from the application of this type of work to the production of new drugs. The substitution of one organic radical for another in the nucleus of a compound may lead to some modification in therapeutic effect or to an alteration of the ratio of therapeutic dose to toxic dose, but it is very rarely that any new drug possessing outstanding advantages is brought to light.

While our knowledge of the relation between chemical constitution and physiological action remains incomplete it is inevitable that investigators will desire to try the effect of variations in the constitution of organic compounds upon their physiological effects. Nevertheless one feels that some of these compounds are introduced into medicine prematurely and without sufficient justification for believing that they possess new and valuable remedial properties.

Vegetable Drugs.—A review of the literature reveals little of interest in relation to new vegetable drugs. Ephedra is the only important one which has come into use during the past ten years. The crude drug has not been introduced into the British Pharmacopœia, 1932, but it is recognised in the form of the hydrochloride of the principal alkaloidal constituent, ephedrine. There has been much investigation of the pharmacognosy, chemistry and pharmacy of the different species of ephedra. Several alkaloids, of which *l*-ephedrine and *d*-pseudo-ephedrine are the most important, have been described. These alkaloids occur in different proportions in the different species of ephedra. Some Indian species give good yields of pseudo-ephedrine, which has been recommended for clinical use instead of ephedrine, as being cheaper and equally effective. Ephedrine, as might be expected from its closely similar chemical structure, resembles adrenaline in physiological action, but has the advantages that it is absorbed when taken by the mouth and its action is sustained for a longer time.

Attempts have been made to discover drugs for the relief of the distressing condition known as "parkinsonism," which may follow encephalitis lethargica, a problem which is comparatively new to medicine. Among the drugs which have been tried are two alkaloids, banisterine, from a South American plant, *Banisteria Caapi*, and bulbocapnine, from *Corydalis cava*. Although good results in relieving the muscular rigidity and tremor of this condition have been reported, the physician still relies chiefly upon the more familiar drug, stramonium, given in large doses. A lengthy series of researches by Gunn and collaborators on the alkaloids of *Peganum Harmala* and derivatives prepared from them has shown that possibilities of clinical usefulness exist in this group. The pharmacology of an Egyptian drug, Ammi Visnaga, and its constituents has been worked out by Samaan with results indicating that

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it may prove of value in relieving spasm of the ureter and as a diuretic. The subject of new vegetable drugs should not be left without mention of a new preparation, totaquina, made from the long-established drug cinchona. This is a mixture of alkaloids which may be obtained directly from the bark or from the residues obtained in the manufacture of quinine. The manufacture and standards have been worked out at the instance of the Health Organisation of the League of Nations, in order to provide a standardised drug at a low price for the treatment of malaria among indigent populations. The British Pharmacopœia, 1932, requires a standard of 70 per cent. of crystallisable cinchona alkaloids, of which not less than one-fifth is quinine.

Anæsthetics.—Among the substances introduced for the production of anæsthesia the gas ethylene should be mentioned. This is now described in the British Pharmacopœia ; a standard of 98 per cent. is required, and a series of tests limiting the proportions of other gases are imposed. Carbon monoxide is the most important impurity by reason of its poisonous properties, and careful investigation was necessary in order to define tests which would ensure the absence of more than negligible amounts of this impurity from ethylene and the other gases described in the Pharmacopœia. The recognition of the value of carbon dioxide as a respiratory stimulant is comparatively new, and its increasing use has led to the inclusion in the Pharmacopœia of a monograph defining standards and tests. The growing recognition of the principle of inducing a "basal narcosis," by the injection of a hypnotic drug, prior to the administration of a general anæsthetic, has led to the introduction of a number of new drugs, among which may be mentioned avertin (tribromethyl alcohol) and certain barbituric acid derivatives sold under the names of amytal, pernocton, and nembutal. The use of these drugs requires careful dosage, and a knowledge of the ratio between the anæsthetic and toxic doses, especially when a sufficient dose is given to produce full anæsthesia without the subsequent use of another anæsthetic, a procedure now in favour with some anæsthetists.

Galenicals

Pharmaceutical research work on galenicals has gone on steadily with consequent improvement in many preparations. It is not possible to go into details of this aspect of the subject, but it is perhaps advisable to refer to the development of analytical standards in the direction of securing constancy of composition in galenicals. Apart from the chemical determination of alkaloids, little information of this kind had been included in the standard works, though the British Pharmacopœia now includes requirements for alcohol content. Standards for other constituents and characters are necessary, and there is need for widespread investigation and collection of data in order that standards for specific gravity, total dissolved solids and PH may be defined. Data with respect to the stability of galenicals, more particularly in relation to the action of light, air, and PH are required, and it may be that the newer methods of examination, as, for instance, the reaction to ultra-violet light, and the determination of refractive index and viscosity, will yield useful information if adapted to the characterisation of galenicals.

The Need for Research

An effect created in the mind of one who has been concerned in the preparation of the new Pharmacopœia is a feeling of surprise at the very considerable gaps which exist in pharmaceutical knowledge and at the number of subjects upon which precise information is lacking. There is need for much investigation even of some of those well-established drugs which are considered worthy of inclusion in the Pharmacopœia. One may hazard the guess that with the publication of the new British Pharmaceutical Codex a similar group of unsolved problems will become evident. This, to my mind, is the chief justification for the existence of this Conference, which has always been the principal medium for the publication of pharmaceutical research in this country.

It is hoped that the Conference Research List which is published annually will stimulate the interest of pharmaceutical workers and will be the means of initiating research on those subjects which are specially connected with pharmacy.

The future of this Conference and its continuation as a useful body in the national life will rest principally upon its reputation as a means for the publication of scientific research in pharmacy, and for the discussion of technical problems. It is more necessary now than ever before that pharmacists should keep abreast of the scientific side of their work if pharmacy is to keep its place. In proportion as they do this so will the standing of their calling and its recognition by others be increased. The success of pharmacy in the future will depend upon the fitness of the individual to carry out in a worthy manner the duties entrusted to him by the community.

Trade Notes

PURFINOL, LTD., 80 Bishopsgate, London, E.C.2, point out that, by a regrettable error, an advertisement was inserted prematurely in our issue of July 22. Telephone: London Wall 7132-7133.

The warehouses and offices of Southall Bros. & Barclay, Ltd., manufacturing chemists, Birmingham, will be closed from 12.30 p.m. on August 5, reopening at 8 a.m. on Wednesday, August 9, at the new address, Priory House, Gooch Street, Birmingham.

CLOSED FOR ANNUAL HOLIDAY.—Thomas Morson & Son, Ltd., Gray's Inn Road, London, W.C.1, and Ponders End, inform us that their works and warehouse will be closed from midday on Friday, August 4, till Monday, August 14. Only a small staff will be on duty in the warehouse to deal with specially urgent orders during that time.

BRONNLEY'S CREAM.—The recent spells of fine, warm weather have created a brisk demand for summer lines, particularly in the toilet department. Bronnley's cream, which is advertised elsewhere in this issue, is recommended by the makers to be an ideal cream for sunbathers, protecting the skin from burning and irritation, and promoting a gentle tan. It is elegantly packed, and striking show material is available on request.

GLUCOLEM.—Mr. W. H. Hampton, chemist and druggist, Gloucester, has sent us a sample of Glucolem, the concentrated glucose lemonade which he supplies under this name. Regarding this product Mr. Hampton states: "Since its introduction to the medical profession in July 1932 this drink has become very popular, both on account of its glucose content (60 per cent.) and as a nourishing, refreshing drink. The taste of the glucose is entirely masked, and Glucolem is thus acceptable to invalids and children."

PARKE, DAVIS & Co., Beak Street, Regent Street, London, W.1, have sent us the following particulars regarding some recently introduced preparations:—Salicylic ethyl ester carbonate is offered as an improvement on acetylsalicylic acid and other salicylic compounds. The salt has the advantage that it does not produce gastric disturbance. It is being supplied in 5-gr. tablets (C.T. 709) in bottles of 25 and 100. The latest additions to the list of food protein extracts are:—No. 292, chocolate ; No. 296, mushroom ; and to the list of miscellaneous protein extracts:—No. 245, house dust (composite) ; No. 247, sawdust (cedar, fir and pine). These extracts are used by the physician when food or other protein poisoning is suspected ; they are issued in collapsible tubes containing sufficient for fifty tests. Another recent introduction is streptococcus immunogen, arthritis. Each c.c. contains the antigen from 2,000 million organisms. Immunogens are issued in vials of 10 c.c. with rubber diaphragm caps.

Births

Notices for insertion in this column must be properly authenticated.

CRILLY.—Recently, the wife of Gerald F. Crilly, M.P.S.I., The Medical Hall, Balbriggan, of a daughter.

MACMAHON.—Recently, the wife of Eugene MacMahon, M.P.S.I., 26 Victoria Villas, Clontarf, Dublin, of a son.

Marriages

SHIRRAS—MORTEN.—At Christ Church, Erith, Kent, on July 22, Edward Shirras, chemist and druggist, to Alice E. Morten, daughter of Mr. Arthur Morten, Hurst Road, Erith.

Deaths

BARRITT.—At White House, Layer Breton, Essex, recently, Mr. Ernest Henry Barritt, J.P., Ph.C., aged sixty-nine. Mr. Barritt carried on business in High Street, Colchester, for many years in the premises now occupied by Boots, Ltd. He had taken an active part in public life, and was Mayor of Colchester in 1903-04. Mr. Barritt, who was a well-known freemason, is survived by his wife.

DRUMMOND.—At his residence, "Kenilworth," Wilkinson Street, Ellesmere Port, on July 25, Mr. Wallace Blair Drummond, chemist and druggist, aged fifty-nine. Mr. Drummond, who was born at Broughton Ferry, qualified in 1900, and after being in business in Glasgow, Dundee and Keith went to Ellesmere Port in 1910, acquiring the business of the late Mr. T. Roberts. He carried on the business successfully, and was held in the highest esteem. Mr. Drummond leaves a widow and two daughters.

GAMBLE.—Recently, Mr. Alexander M. Gamble, Ph.C. Mr. Gamble was for many years identified with the drug trade of Ireland. He was at business as recently as July 22, but became ill on the following day, succumbing a few hours afterwards. He was for thirty-seven years in the service of Shaw & Jamison, Ltd., wholesale druggists, Townhall Street, Belfast, during a portion of which time he occupied the position of director. He severed his connection with the firm in the present year, and took up duty in a senior position with Thomas McMullan & Co., Ltd., wholesale druggists, Victoria Street. Mr. Gamble was one of the oldest members of the Chemists' and Druggists' Society of Ireland, in which he had held office. He was also a member of the Belfast Wholesale Merchants' and Manufacturers' Association, and was identified with the wholesale section of the old Ulster Retail Drug Trade Association. Mr. Gamble is survived by his wife, two sons and three daughters.

PEARCE.—At Newquay, on July 12, Mr. Leslie James Pearce, chemist and druggist, aged thirty-two.

POWER.—In London, S.W., recently, Mr. George Frederick Power, chemist and druggist, aged twenty-eight.

ROWLETT.—At Longford, on July 18, Mr. Oliver William Rowlett, L.P.S.I., aged fifty-five.

SWEETMAN.—At Heaton Norris, on July 17, Mr. Robert Sweetman, chemist and druggist, aged eighty-four.

WILLSON.—At Horncastle, on July 9, Mr. Robert Willson, retired chemist and druggist, aged seventy-six. Mr. Willson, who was a native of Horncastle, served his apprenticeship at Boston, and was in business in London until his retirement five years ago.

Personalities

MR. T. EDWARD LESCHER, O.B.E. (managing director of Evans Sons Lescher & Webb, Ltd.), and Mrs. Lescher were among the guests at their Majesties' garden party on July 20.

MR. JOSEPH MORTIMER, who has been elected Mayor of Nairobi, Kenya Colony, is the father of Mr. Arthur Mortimer, barrister-at-law, secretary of the Wholesale Drug Trade Association.

NOTICE is given in "The London Gazette" that Henri Blumovitch, 6-7 Union Mansions, Adler Street, London, E.1, medical practitioner, has assumed the name of Henry Blair by deed poll.

MR. J. W. ROBERTS, 10 Tavistock Place, W.C.1, honorary secretary of the Chemists' Dental Society, has been elected chairman of the Metropolitan Branch of the Public Dental Service Association.

IT is interesting to place on record that Mr. Frederick Youldon, glass bottle merchant, Basinghall Street, London, E.C.2, was a member of the Corporation Reception Committee entertaining the delegates to the British Pharmaceutical Conference at Guildhall on July 24. Mr. Youldon has been a Common Councilman of the City for the past five years. He is a past-president of the City Livery Club and of the United Wards Club of the City of London. This year he is president of the Bartholomew Club and vice-president of Bassishaw Ward Club.

Sporting Events

THE first annual competition of the Northumberland and Durham Chemists' Golf Alliance for the B.D.H. challenge cup was played for over the Bridle Path golf course, recently, with the following results:—(1) A. L. Joy, net 76; (2) A. Walker, 81; (3) W. Cosans, 84.

THE annual sports day arranged in connection with the West Ham and Eastern District Association of Pharmacists and Branch of Pharmaceutical Society was held, on July 20, at the Red Triangle Sports Grounds, Wanstead.

Mr. A. Mortimer (president) was present with Mrs. Mortimer, who presented the prizes. The competitive events were composed of golf (played on Wanstead golf course), tennis, croquet and putting, with athletics for the juniors. The results were as follows:—Golf, Mrs. Leith; tennis, lady, Mrs. C. B. Pratt; gentleman, Mr. Middleton; clock golf, lady, Mrs. Reed; gentleman, Mr. Leith; obstacle golf, Mrs. Gray; croquet, lady, Mrs. Main; gentleman, Mr. Dennis Desmond; quoits, Mr. Gray; throwing cricket ball, Mr. Evans; 100-yds. gentlemen's race, (1) Mr. Middleton, (2) Mr. Andrews, (3) Mr. A. G. Reed; 220-yds. gentlemen's race, (1) Mr. Andrews, (2) Mr. Middleton; (3) Mr. A. G. Reed; sack race (ladies), (1) Mrs. Middleton, (2) Miss Main; sack race (gentlemen), (1) Mr. Andrews, (2) Mr. Shelly; 100-yds. ladies' race, (1) Miss Main, (2) Miss Maxey, (3) Miss Desmond.

Information Department

INFORMATION WANTED

B/27. Alga teats
B/27. Allied foot support
B/26. Arsenaferratose
B/26. Camelia sunburn cream
B/26. Elimintol tablets
F/26. Ferramol
S/27. Gono-arthrin
B/27. Hysepticol
E/27. Lenycoll
B/26. Perstik (London source)
B/26. Radilex
E/27. Zillion powder

THE
CHEMIST AND DRUGGIST
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The Conference Papers

This year's meeting of the British Pharmaceutical Conference, the closing session of which is being held as we go to press, is the tenth to be held in London, the ninth being the Diamond Jubilee meeting of 1923. We congratulate the Conference on having made the selection of Dr. C. H. Hampshire as its chairman for the current year. Details of Dr. Hampshire's distinguished record are given on another page of this issue; but we may remind our readers that he has been a member of the Conference Executive for twenty years (during ten of which he was a general secretary), and has been secretary to the Commission responsible for the production of the British Pharmacopœia, 1932. His address as chairman of the Conference, under the title "Pharmacy in Retrospect and Prospect," made fitting reference to the importance, to medicine and pharmacy alike, of the monographs in the new Pharmacopœia. The text of the address will be found on pp. 120–128. In the Science Section the large number of papers recorded last year has been exceeded by one, making a total of thirty. Messrs. Norman Evers and Wilfred Smith have continued *The Analytical Classification of the Fish-Liver Oils*: their principal conclusion is that for none of these oils is the blue value more than an approximate measure of the vitamin-A content. Mr. F. J. Dyer finds that there is a fairly definite *Relationship between the Antimony Trichloride Blue Value of Cod-Liver Oils and that of their Unsaponifiable Fractions*, and has made a mathematical study of the probability of correlation of predicted and experimental values. Messrs. T. E. Wallis and T. Dewar review the anatomical features of *Buchu and the Leaves of other Species of Barosma*, and provide an identification chart. Messrs. W. A. Woodward and A. N. Cowland have studied *The Stability of Aqueous Solutions of Gallo-tannic Acid*: although the rate of deterioration in six months at moderate temperatures is found by them to be negligible, they recommend the use of a small quantity of a suitable preservative. A problem which has exercised the minds of chemists of late is investigated by Miss E. M. Smelt in her paper on *The Keeping Properties of Liquor Arsenicalis*: the author concludes that it is not possible to prepare an entirely satisfactory neutral solution of arsenic. Messrs. A. D. Powell and G. F. Hall have devised improved methods for *The Determination of Acriflavine and Related Medicinal Dyes*. Dr. E. Lozinski and Messrs. G. W. Holden and G. R. Diver discuss *The Relative Activity of Ergotoxine and Ergotamine with Special Reference to the Assay of Ergot Preparations*, and suggest corrections for the observed readings when extracts of ergot are assayed colorimetrically. Miss E. M. Smelt has investigated *The Keeping Properties of Liquid Extract of Ergot*, and finds that storage in an ice-chest is necessary to ensure its stability. Mr. G. J. W. Ferrey, in a paper on *The Determination of Moisture in Mercuric Oxide*, finds that the temperature for drying ordered in the British Pharmacopœia and in the U.S.P. (150° C.) is the cause of considerable error, and suggests drying for an hour at 70° C. A *Note on the B.P. Limit Test for More Soluble Sugars in Lactose* is contributed by Mr. G. J. W. Ferrey, who prefers 0·007 gm. of residue from 5 gm. to the 0·005 gm. of the Pharmacopœia. In *The Effect of Calcium Administration on the Toxicity of Carbon Tetrachloride in Mice*, Mr. Frank Wokes finds that the administration of calcium fails to produce any material reduction in the susceptibility of mice towards poisoning by carbon tetrachloride. Mr. J. C. Gage has investigated *The Variation in the Susceptibility of Mice to Certain Anæsthetics*: he shows that there is little, if any, difference as regards their margins of safety. In a paper on the *Estimation of Parathyroid Hormone*, Mr. F. J. Dyer amends the method suggested by him in an earlier note. Mr. Noel L. Allport has devised *A New Method for the Determination of Elemental Sulphur* which is rapid, accurate and applicable to the official preparations of sulphur. Messrs. C. T. Bennett and N. R. Campbell have evolved a method for *The Determination of Iron* on definite principles, with a view to securing greater uniformity among analysts. Mr. T. Dewar deals with *The Histology of the Leaves of Digitalis Thapsi*, and shows how they are differentiated from the official drug. Messrs. Alan H. Ware and Victor Smith, in *The Precipitation of Alkaloids by Tannins and the Use of Antipyrin in the Detection of Tannins*, have devised a new tannin test as a method of detecting alkaloids. Mr. A. D. Powell has evolved *A New Colour Reaction for Bismuth*: he gives a qualitative test and a quantitative test. Miss E. M. Smelt, in a paper on *Chemical Tests for Strophanthus*, concludes that four of the fourteen colour tests for strophanthus suffice to distinguish between the varieties likely to appear on the drug market. A *Spectroscopic Investigation of Gum Acacia* has been carried out by Dr. S. Judd Lewis and Mr. J. Wombwell, who provide valuable information as to the elemental constituents of the ash of gum acacia as a result of the application of spectroscopic methods. In *A Comparison of the Action of Various Solvents on Defatted Cochineal* Mr. John Rae suggests ethylene glycol as an excellent medium, and prefers an ash limit of 6 per cent. to that of the British Pharmacopœia. Messrs. Charles M. Caines and Norman Evers discuss *Compound Tincture of Cardamom: the Loss of Colour in Certain Mixtures*, and arrive at the conclusion that decolorisation in mixtures containing this tincture is due to alkalinity. Mr. C. Morton, from an examination of *The Decomposition of Acetylsalicylic Acid in Aqueous Solution*, finds that the use of stock mixtures of it, or of heat in effecting solution, is inadmissible. *Changes in Acid Solutions of Adrenaline* are discussed by Mr. L. A. Haddock: he finds, *inter alia*, that changes produced by light are small from a quantitative standpoint, and consist mainly in slight oxidation, and that sterilisation at 80° C. for an hour causes slight destruction of adrenaline. Mr. H. Treves Brown suggests a new formula for *Mistura Bismuthi Hydroxidi*, and provides *Some Proposed New*

Formulas for the British Pharmaceutical Codex. In a paper on *Solution of Arsenious and Mercuric Iodides*, Mr. F. R. C. Bateson shows that the mercuric iodide in Donovan's solution probably enters into combination with the free acid and not with the arsenic. The *Variation in Solubility of Calcium Lactate* has been investigated by Mr. Norman Glass, who finds that specimens differ in solubility with different processes of manufacture, and that the true explanation of this difference has yet to be found. Mr. B. Veness has tabulated *The Yield of Extractive in Unstandardised Official Extracts.* After examination of *The Preparation and Storage of Solutions of Tribromethyl Alcohol*, Mr. W. H. Butchers, Dr. K. Bullock and Mr. G. R. Priddey have devised a new test for incipient decomposition in such solutions to overcome a danger point in their use for rectal narcosis. Two meetings of delegates from the Pharmaceutical Society's branches have been held, and the social events, recorded in our columns up to the time of going to press, have specially commended themselves to visitors from the provinces.

Cinderellas of the Press

During the past few days the general public has been regaled to the point of repletion with florid accounts in the daily papers of the beauty, originality and value of the Advertising Exhibition at Olympia. Columns have been printed of what many in high places had said about advertising, and what they had seen of the great advance made in the art of recent years. The event was heralded as the beginning of a new era in which the principal part in the world recovery, which every man desires, is to be played by advertising—in the daily paper. While the general thesis that advertising is an absolute necessity for the development of modern business is incontrovertible, one searched in vain throughout the newspaper panegyrics for mention of the main essentials in publicity—the sympathy, co-operation and goodwill of the distributor. This, as every successful manufacturer and first-hand supplier knows, is best secured by utilising the trade and technical Press. The bright young men who in these days make their living by placing advertising, have slavishly copied (to an amusing extent) the methods, and even the jargon, of their American contemporaries. They have advised their clients to use, at no matter what expense, only the big circulations in the dailies. The distributor for wholesale, export or retail was to them a secondary consideration. "Create demand through the consumer, and the distributor will be forced to stock," was the popular slogan, and thus, it was argued, the trade journal in the advertising field is a negligible quantity. The idea was sedulously fostered, as was natural, by the popular press; but the slump in consumption has brought about a change of tone, and it looks as if, at long last, the trade journal might come into its own.

An International Object Achieved

Hitherto, as Sir Gerald Chadwyck-Healey said in a speech at Olympia (p. 118), the trade and technical papers have been the "Cinderella of the Press"; but at the same gathering, Dr. E. L. Burgin, Parliamentary Secretary to the Board of Trade, pointed out that the trade and technical press—

> "Knowing no nationality, serving no insular object or party view, but endeavouring, with the impartiality of the real scientist, to present a basis of truth, at once achieves an international object and places the world in its debt. Interchange of ideas between experts of all parts of the world is facilitated."

The signs are hopeful, therefore, that the professional advertising man, and even the daily press, may come to recognise that real world recovery can be materially advanced by encouraging and not despising the assistance afforded by journals devoted exclusively to trade matters. Again quoting Dr. Burgin:—

> "The part played by the technical paper is hard to over-estimate. In the long run only exact knowledge is of use. There is all the difference in the world between a journalist's account, and the account of the technician or trade expert given in the specialised press."

That these truths are appreciated by business men in industry at home and abroad was obvious from their endorsement by the great gathering to which they were addressed. That meeting was thoroughly representative, not only of leading men in the principal industries of this country, but likewise of the Government and of the British Colonies and Dominions as well as of foreign countries. Besides the Parliamentary Secretary to the Board of Trade, there were present a Lord Commissioner of the Treasury, the Agent-General for South Australia, the Agent-General for Ontario and the Minister for Norway. In the course of an interesting speech the Norwegian Minister said that the British trade press was fostering the exchange of goods of excellence, and that in foreign countries there was scarcely any business man who was not familiar with the British trade paper in his particular field.

In the Pharmaceutical Industry

The chemical industry, pharmacy and the drug trade were represented at this gathering by Commander H. S. H. Ellis (Imperial Chemical Industries, Ltd.), Mr. J. Davidson Pratt (Association of British Chemical Manufacturers), Mr. R. R. Bennett (The British Drug Houses, Ltd.), Mr. Geoffrey E. Howard (Howards & Sons, Ltd.), Mr. Kenneth C. Allen (Stafford Allen & Sons, Ltd.), Mr. E. T. Neathercoat (Savory & Moore, Ltd.), Mr. B. E. Kent (Allen & Hanburys, Ltd.), Mr. Stanley Whiffen (Whiffen & Sons, Ltd.), Mr. R. W. Wren (Potter & Clarke, Ltd.), and Mr. H. Vincent Dodd (Meggeson & Co., Ltd.). It is particularly gratifying to realise that men so representative of all that is best in the pharmaceutical industry are satisfied that science and the sober statement of instructed fact is likely to lead more quickly and more certainly to world recovery than the sensational boosting of stunt circulations. Commander Ellis pricked the bubble of the big circulation craze by reminding the company that not quantity, but effective quality was the criterion by which the discriminating advertiser to-day determined the value of an advertising medium. Let us hope, therefore, as the Commander suggested, that "Cinderella may eventually meet her Prince."

People I Have Met

By Viator

REMINISCENCES are a good deal in evidence in the pharmaceutical Press at the present time; these are usually of happenings in the pharmacy from the days of apprenticeship onwards. I have had my share of these—perhaps more than my share—but I do not intend to inflict an account of any of them upon readers of this article. It has, however, been my good fortune during many years in retail and wholesale pharmacy to meet several authors, divines, politicians and others, and in some cases I have been privileged to know them in a somewhat closer manner than is the case with the average shopkeeper: some of these experiences, with a few others, may be interesting.

I was apprenticed under the shadow of one of the Royal residences, and we were quite familiar with the sight of Queen Victoria riding in the neighbourhood in her carriage, with outriders. Our business was of a mixed character rarely found to-day; amongst the many departments was that of sheep dipping. The apparatus, consisting of a heavy wooden bath, drainer, box of arsenical dip, and other articles, was conveyed round the countryside in a two-wheeled cart, drawn by an old mare of most uncertain temper. She was particularly fond of suddenly standing stock still, usually in the most inconvenient places, and she would only move on when she thought fit. One day she was jogging along with the cart on a road of no great width, although with care two vehicles could pass each other. Suddenly, without warning, she stopped; and at the same time the driver saw, with dismay, the well-known Royal equipage coming towards him at a pretty rapid rate. He jumped down and tried coaxing and tugging the mare, but all to no purpose. The Royal carriage was stopped a few yards away, and one of the outriders jumped down from his horse and lent his aid to the driver. Together they managed to back the mare so that the Queen could be driven by.

An Eccentric Nobleman

The same driver, our old warehouseman, once took a load of paint to the then residence of the Duke of Westminster. He was admitted through the yard gates by a man dressed somewhat roughly and having the appearance of a "handy man." It was necessary to use some care in lowering from the cart a heavy keg of white lead, and our man asked for the assistance of the "handy man," which was willingly given. When the cart was unloaded our man gave his temporary assistant a few coppers, which were thankfully received with a touch of the cap. It was only when he was driving through the gates on his way home that he learnt, to his astonishment, that his assistant was the Duke, who was very fond of jokes of this type.

One of my earliest encounters with a politician of any eminence was that with Justin McCarthy, the Irish author and journalist, the writer of a book which had a considerable vogue entitled "A History of Our Own Times." He wrote also several lives of statesmen and many novels. He was a striking figure, with Victorian moustache and beard, and he was often in our shop. My employer, a pharmacist of some culture and of a conversational type not often found to-day, used to discuss politics with him, and I listened from behind the dispensary screen. Sometimes he was accompanied by his son, Justin Huntly McCarthy, a prolific writer of novels and of plays. Another man of letters had been a pretty good customer of ours, as he had resided for many years in a village about three miles distant; this was Mortimer Collins, a leader-writer of distinction and (I believe) the brother of Wilkie Collins.

I got to know in after years William Canton, mostly known by his book "A Child's Book of Saints," very well indeed. He had been sub-editor and leader writer of "The Glasgow Herald" and a sub-editor of "The Contemporary Review," and was regarded as a writer of children's stories second only to those of Charles Lamb. The late Dr. Robertson Nicoll somewhere stated that in his opinion Canton was the most brilliant conversationalist he had ever met. When I knew him he was a man sixty-five years or so of age. He died in 1926 at the age of 81. Looking over a street barrow of old books a few days ago I came across a clean copy of his "Invisible Playmate," for which I paid threepence!

About the same time that I got to know Canton I made the acquaintance of W. W. Jacobs, who came in my shop one day and handed me a script to dispense. Anyone less like the popular conception of a humorist than Jacobs it would be difficult to find: no sign of a smile, a small man with a quiet, reserved manner. He would always talk on literary matters, and I learnt a good deal from him. I have always regretted that I did not make more of an opportunity I once had to get some first-hand information about Robert Louis Stevenson. I spent some hours with a missionary, a Mr. Clark, who, I found out afterwards, was a great friend of the novelist when he was in Samoa and who was with him when he died.

Types of Divines

Leaving the literary people, let me pass on to the divines. My earliest contact in pharmacy with a parson of any eminence was when I was an assistant in an historic South London pharmacy. One of our customers was Dr. Guinness Rogers, a celebrated Free Church minister, an ardent Liberal politician and friend of Gladstone. A year or two before I took the post of assistant, the "G. O. M." had addressed a crowd of his supporters from the window of Dr. Rogers's dining room. The good doctor was a preacher full of mannerisms, and occasionally he would pace backwards and forwards in our shop, holding forth in best pulpit style to the "boss" and myself upon the topics of the day. I well remember that one morning in 1895 he came into the pharmacy in great excitement. A review had appeared that morning upon Grant Allen's "problem" novel, "The Woman Who Did." In these days such a novel with such a theme would have excited little or no comment. The Doctor, however, seized the occasion, to the great amusement of customers who kept dropping in, to deliver a violent denunciation of the work, and finally flung himself out of the shop, presumably to prepare a vitriolic sermon upon the book.

A man of a different type was Canon A. M. Norman, F.R.S., whom I got to know in later years. I mention him here because he told me he was a friend of our own H. B. Brady, F.R.S., naturalist and pharmacist. Canon Norman was a marine zoologist, and his collection of the invertebrate fauna of the Atlantic and Arctic Oceans is now in the British Museum. Brady, as is well known, was a pharmacist at Newcastle-on-Tyne from 1855 to 1876. He was elected F.R.S. in 1874, and was an authority on the Foraminiferæ.

One day a victoria drew up outside my pharmacy (the style of conveyance will indicate that it was some years ago), and on going out I found myself talking to Canon Scott Holland, who handed me a script. He often called; he was a big, genial man, a preacher of rare distinction and a voluminous writer on theological subjects. He was a canon of St. Paul's during the *régime* of Dean Gregory. Speaking of deans reminds me that I knew very well Dean Fry, of Lincoln, whose recent death will be remembered. He was headmaster of Berkhamsted School, and when he went to the Deanery of Lincoln he was an old man.

Most of the names mentioned are those of noted people whom I met in the early and middle years of my life. It was my privilege, which I highly value, to know the late Sir Arthur Conan Doyle for the two years preceding his death, which is fresh in the minds of readers. He was a big man, physically and mentally, a writer of fiction that will live, a propagandist for the Empire, a friend always of the under-dog, a champion of lost causes whose life was extraordinarily full and rich.

BRITISH PHARMACEUTICAL CONFERENCE

The Proceedings

FOR many years past we have introduced our report of the Conference proceedings by giving a brief account of annual meetings previously held in the same city or town. During the seventy years of its existence the Conference has met in thirty-six centres; and it happens that London has had more than its proportionate share of visits—nine, without counting this week's—the primary reason being the exigencies of war conditions in the years 1915-19 inclusive. The first London meeting opened on Wednesday, August 5, 1874, with a conversazione given by the Pharmaceutical Society, and closed on the following Saturday with an excursion. THE CHEMIST AND DRUGGIST, at that time a monthly publication, brought out a thirty-two page Special Issue reporting the proceedings, and copies were distributed to visitors as they started on the excursion. The president was Mr. T. B. Groves; the general secretaries were Professor Attfield and Mr. F. Baden Benger; and the local secretary was Mr. Michael Carteighe. The attendance did not come up to expectation, even the dinner being attended by "not much over 100 persons"—one of whom, it was recorded, interjected a "Hear, hear" in the wrong place. The Conference did not meet again in London till 1900, when Mr. E. M. Holmes was president, Messrs. W. A. H. Naylor and F. Ranson were general secretaries, and Messrs. W. Warren and H. Cracknell local secretaries. Our report included a description of the dresses at the official garden party. London was next selected as the meeting place in 1913, the jubilee year of the Conference, under the presidency of Mr. J. C. Umney. The general secretaries were Messrs. H. Finnemore and R. R. Bennett, and the local secretary was Mr. W. J. U. Woolcock, who had just been appointed secretary and registrar of the Pharmaceutical Society. By this time the short-lived Practice Section had been set up: four papers on the Sale of Food and Drugs Acts were read by Messrs. H. Wippell Gadd, C. A. Hill, J. P. Gilmour and E. Hinks, with Mr. (afterwards Sir) William Glyn-Jones in the chair. The outbreak of the European war led to the holding of a series of formal meetings in London in the years 1915-18 inclusive; and in 1919, although the war had been brought to an end, the slow relaxation of war emergency regulations by the Government of the day rendered it expedient to select the Metropolis once more. The presidents for these years were:—1915, Major E. Saville Peck; 1916, Dr. David Hooper; 1917-18, Mr. C. A. Hill; 1919, Mr. William Kirkby. In 1919 Mr. Finnemore resigned from the post of senior general secretary and Mr. Bennett took his place, with Dr. C. H. Hampshire (this year's chairman of the Conference) as junior general secretary. When London was next chosen, four years later, for the annual meeting, the Pharmaceutical Society had taken over the management of the Conference and the former presidents had been succeeded by Mr. F. W. Gamble, the first of a line of chairmen.

Photo] *[Lafayette*

THE RT. HON. THE LORD MAYOR OF LONDON
(SIR PERCY GREENAWAY)

BRITISH PHARMACEUTICAL CONFERENCE 1933

Opening Session

Tuesday, July 25

Tuesday morning was brilliantly fine, and the large gathering that assembled at the Grosvenor Hotel seemed in excellent spirits. Shortly after ten o'clock Dr. C. H. Hampshire took the chair, with a microphone before him. On his right were Lord Macmillan, the president of the Pharmaceutical Society and of the Conference (Mr. John Keall), the vice-president of the Society (Mr. E. Saville Peck), Mr. W. J. Beardsley, Mr. F. G. Hines, Dr. J. J. Hofman, Dr. David Hooper, Mr. H. N. Linstead, Mr. A. R. Melhuish (chairman of the London Executive Committee), and Mr. Philip F. Rowsell; on his left were Mr. R. R. Bennett, Mr. J. H. Franklin, Mr. F. W. Gamble, Dr. F. W. Crossley Holland, Mr. D. Lloyd Howard, Mr. W. A. H. Naylor, Mr. Herbert Skinner, and the general secretaries (Messrs. C. E. Corfield and G. R. Boyes). The official welcome to the Conference was given by Lord Macmillan on behalf of the Lord Privy Seal (Mr. Stanley Baldwin). In one of the most felicitous speeches that it has been the privilege of Conference audiences to hear, Lord Macmillan dwelt on the dual character of pharmacy as a profession and as a trade, lightly touching on the London Pharmacopœia of 1618 and other topics by way of illustration. A profession, Lord Macmillan suggested as a definition, is carried on for its own sake, this feature distinguishing it from a simple trade. The applause which marked the conclusion of a delightful introduction to the proceedings was hearty and sincere. A vote of thanks was briefly moved by the president, and then the chairman delivered his address, prefacing it with a welcome, partly in English and partly in French, to the foreign visitors. Lord Macmillan paid the chairman (and the Conference) the great compliment of remaining to listen to the address. The full text of the address (which was delivered in an abridged form) is printed on pp. 120-28. The vote of thanks to the chairman was proposed by Mr. Skinner, who, speaking as the immediate past-chairman of the Conference, exhorted those present to read the address in full. Mr. Naylor, the senior past-president of the Conference, seconded, and the vote was carried with acclamation. The ladies were released at this point, and the men settled down to work.

THE PRESIDENT OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN

MR. JOHN KEALL

The Official Welcome

The Chairman first introduced Lord Macmillan, who, he said, had come to give them a welcome to London on behalf of the Lord President of the Council.

Lord Macmillan said:

It is my pleasant privilege this morning, on behalf of the Lord President of the Council, to extend a most hearty welcome to the members of this important conference. I have received a note from Mr. Stanley Baldwin in which he desires me to express his regret that he cannot have the pleasure of being with you. But I am sure you will all understand that at this moment Mr. Baldwin's engagements for every hour of the day are very numerous indeed. But on his behalf, as representing the head of the Privy Council, I can assure you the welcome extended to you is most hearty and most warm, and that welcome is extended to the members of the British Pharmaceutical Society, but also and—may I say?—quite especially to those representatives of foreign countries who are attending your deliberations. Science has no political frontiers, and in the great work of your profession you know no such limitations. I know how valuable have been the international conferences which have been held, whose task has been the standardising and safeguarding of important drugs, and also the prevention of their abuse. These labours are of the very highest consequence to humanity, and for their effective carrying out it is necessary that there should be not only national, but international, effort, and we have therefore very much pleasure in welcoming our confrères from other countries. (Applause.) It is really impossible to overestimate the value of the services which this Society has rendered. It appears to me in its activities to deal with three of the main concerns of human society. In the first place it is a learned and scientific body engaged in important scientific research and investigation. In the next place—and this is a feature one dwells upon with especial pleasure—it is, if I may say so, Mr. Chairman, a philanthropic institution. Who can estimate the good that has been done to humanity by your labours? I know personally, and I have personal reason to know, what alleviation to human suffering can be brought by the use of certain medicaments; to mention one matter alone, that of anæsthesia, which has enabled the surgeon to carry out operations which were impossible in the past and has saved myriads of human lives. It is a great thing to belong to a society which is not only scientific, but beneficent; and you have—being a Scotsman you won't resent my reference to it—(laughter)—for even scientists and philanthropists must live—(laughter)—and in carrying on as you do a great branch of important commerce in this country you are making a third contribution to the welfare of our nation. I have been

BRITISH PHARMACEUTICAL CONFERENCE 1933

fortunate enough to have what I may perhaps call an accidental association with your profession.

LORD MACMILLAN, proceeding, recalled that some years ago it was his privilege to be chairman of a Committee, which was set up by the Privy Council, to investigate the methods of preparation of the British Pharmacopœia. In the course of the evidence which that Committee received he was able to see that education in matters relating to the pharmaceutical profession had advanced by leaps and bounds. He learned quite a lot about pharmacists, and he confessed he found it exceedingly interesting. The Committee's primary task was to consider whether the existing methods of dealing with what he might call the pharmacists' "Bible" or "Revised Version"—(laughter)—were altogether satisfactory. As a result of the valuable evidence which they received, some of it from representatives of the Pharmaceutical Society, they were to devise a method of consultation which, he thought, was now working satisfactorily. A very important feature of that scheme was that it had secured for the Society what he hoped they would regard as an adequate recognition of the importance of the contribution which pharmacists could make to the work. Now the Society was represented on the Commission and officially recognised as a participant in the work, and it was a great pleasure to him to know that the chairman that day was having something to do with the work, being the first secretary of the Commission. (Applause.) In the course of the investigations he went a little outside the immediate terms of reference, for he found the history of the pharmaceutical profession extraordinarily fascinating. He found both in London and Edinburgh documents which were the most horrific he had ever seen. (Laughter and applause.) Some of the first general prescriptions were only equalled by the prescription for the witches' broth in Macbeth, and the most appalling hell broth he had ever heard of. One singled out for special notice was composed of a hundred ingredients, on the ground, he supposed, that, like a machine gun, if they were all used they would be bound to hit something. In theology, and in law and medicine, the first stages were mixed up with incantations. There were still in his (the legal) profession many traces of such matters. In theology there were elements of magic, but the pharmaceutical profession had become extremely scientific, and the Pharmacopœia had rigorously excluded anything which could be attributed to astrology. He congratulated the Society on the elimination of such elements. (Laughter and applause.) As chairman of the University Court of the University of London he was happy to know that the School of Pharmacy was a school of the University in the Faculty of Medicine (Applause.) The association of the pharmaceutical profession with the University was a very important thing, and was a recognition that they were not only business men but also men of learning. The difference between a mere trade and a profession was that while a trade was carried on for the purpose of gain a profession was carried on for its own sake. The fact that pharmacy had a school was a recognition of the part they were concerned with, a profession for its own sake, for learning science. He was most happy to be associated with them on that side. He knew that they had had some difficulties with the School of Pharmacy, but he hoped that as time went on those difficulties would disappear, and it would be an avenue to the higher branches of the profession. (Applause.) He had had the advantage of looking through their programme and he was happy to observe that some of its more astringent qualities had been mitigated by excellent demulcents. (Laughter.) On the previous night they had had a most charming reception at the Guildhall. ("Hear, hear," and applause.) In itself, the first act of welcome in London and the recognition which they had received in that ancient hall must have been a source of pleasure and satisfaction to them all. (Applause.) The hospitality of London was proverbial, and it was nowhere better exemplified than in the Guildhall. Their programme combined the more serious with the lighter elements, and that was a very happy method of compounding a programme. (Laughter.) He wished all success to the labours of the Conference.

THE PRESIDENT'S REPLY

MR. JOHN KEALL (president of the Pharmaceutical Society) proposed a vote of thanks to Lord Macmillan for the warmth and generosity of his welcome. He regretted that Mr. Baldwin could not be present, but the Conference was proud of receiving such a welcome from Lord Macmillan, who had established certain contacts by his references to the Committee over which he had presided. As a result of the deliberations of that Committee the Society had been given an opportunity of filling a niche in the revision of the Pharmacopœia, a task which, with all modesty, they felt they were competent to deal with. The president added an expression of appreciation of Lord Macmillan's good wishes for the success of the Conference.

The resolution was carried with acclamation.

CHAIRMAN'S ADDRESS

The chairman then delivered his address, the text of which is printed on pp. 120-128. Before commencing the address he offered a welcome to the visitors present. They had with them, the chairman said, pharmacists from Canada, from Australia, from New Zealand and from South Africa. To all of these representatives of the Dominions of the British Empire he extended in the name of the Conference the most cordial greetings. The problems of pharmacy were much the same the world over. They had present also representatives of pharmacy from various countries of the Continent of Europe, and to these also he wished to address a welcome to the Conference.

VOTE OF THANKS

MR. SKINNER said that as the immediate past-chairman of the Conference it was his privilege and honour to propose a vote of thanks to Dr. Hampshire. He suggested that all pharmacists should read carefully the address which had been delivered by the chairman, for it gave, in his opinion, some of the best sides of pharmacy and showed the way in which pharmacy should progress. Dr. Hampshire had dealt with his subject as they all desired it should be, first from the historical point of view, then putting forward the details of their present knowledge, and finally giving something of the outlook for the future to inspire them to go forward. The chairman had said that the success of pharmacy in the future depended upon the fitness of the individual to carry out in a worthy manner the duties entrusted to him by the community. That was the key to the pharmaceutical profession of the future. Dr. Hampshire's services to pharmacy and to the Conference had been appreciated for many years, and those present were proud to see him in the chair, and particularly proud of the address he had given.

MR. NAYLOR seconded and characterised the address as masterly, and one deserving careful study. It was comprehensive in its survey of the advance made during the last decade in chemical and pharmacological knowledge of some important drugs that were well known and others that were comparatively new, and would therefore require to be carefully studied by pharmacists. The address was an illuminating commentary upon some of the important drugs that were now included in the 1932 Pharmacopœia. Was it too much to hope that in the next decade their information on at least official remedies, and particularly those in general use, would have advanced to a point where the pharmacologist, the clinic, and the general practitioner would be found in common agreement as to their mode of action and therapeutic activity? In that achievement the chemist would be called upon to play no unimportant part.

THE CHAIRMAN of the Conference suitably acknowledged the vote of thanks.

Apologies for absence, it was announced, had been received from Messrs. F. Ransom, J. Humphrey, W. Kirkby, Professor Van Itallie, the secretaries of the American Pharmaceutical Association and the Swiss Pharmaceutical Society, and other pharmacists.

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Science Section

Tuesday Morning

After a brief interval, the reading of the science papers was commenced with the presentation of two on fish-liver oils and cod-liver oils respectively. The first was presented by Mr. Wilfred Smith and the second by Professor J. H. Burn.

The Analytical Classification of the Fish-Liver Oils

By Norman Evers, B.Sc., F.I.C., and Wilfred Smith, B.Sc., A.I.C.

[Abstract]

In the first part of this paper an attempt was made to correlate the chemical characters of the fish-liver oils with the zoological classification of the fish, more particularly in regard to the nature of the unsaponifiable matter. In addition to the usual analytical characters of the oils, the iodine values of the unsaponifiable matter were determined and a quantitative method for the separation of cholesterol from the dihydric aliphatic alcohols based on the solubilities of the acid phthalic esters in petroleum spirit was applied to the unsaponifiable matter. These values have been found useful in determining the type of fish from which an unknown oil has been obtained. During the past year the authors have been able to obtain further authenticated samples of a number of these oils. These have been examined by the same methods. The results of the examination of the unsaponifiable matter are given in Table I, while the ordinary analytical characters are given in Table II (see p. 138). The unsaponifiable matter has been determined by the method recommended in the Report of the Subcommittee of the Society of Public Analysts.

Table I

Oil	Species	Unsaponifiable matter		Acid phthalic esters per cent. on unsaponifiable matter	
		Total per cent.	Iodine value	Soluble in petroleum spirit	Insoluble in petroleum spirit
Cod:—	*Oils of Gadidae family*				
Norwegian (i) ...	*Gadus morrhua* ...	1·48	111	104	17
(ii) ...	*Gadus morrhua* ...	—	91	114	18
North Sea (i) ...	*Gadus morrhua* ...	1·20	89	113	24
(ii) ...	*Gadus morrhua* ...	—	88	114	29
Newfoundland	*Gadus morrhua* ...	1·36	113	114	21
Coal fish (Saithe)	*G. virens*	1·40	94	84	31
Haddock ...	*G. aeglefinus* ...	1·22	90	103	15
Ling (i)	*Molva vulgaris* ...	0·98	98	—	—
(ii)	*Molva vulgaris* ...	0·92	99	108	27
Torsk (Brusmer) (i)	*Brosmius brosme*	3·34	99	103	35
(ii)	*Brosmius brosme*	1·00	96	110	41
Hake	*Merluccius vulgaris*	2·0	75	110	94
	Oils of Elasmobranch fish				
Blue shark ...	*Carcharias glaucus*	13·0	78	58	109
Black shark ...	?	14·8	78	64	95
Ground shark ...	*Carcharias littoralis* (?)	11·6	74	53	140
Shark	(?)	11·38	68	—	—
Dogfish (i) ...	*Acanthias vulgaris*	11·2	71	51	115
(ii) ...	*Acanthias vulgaris*	14·12	71	39	140
Skate (i)	*Raia batis* ...	2·2	82	84	57
(ii)	*Raia batis* ...	1·72	74	89	53
	Oils of Flat-fish (Pleuronectidae)				
Halibut	*Hippoglossus hippoglossus*	9·22	102·5	100	34
Turbot	*Rhombus maximus*	4·74	78	109	28
Monk-fish ...	*Lophius piscatorius*	2·28	68	120	25

The determination of vitamin A by the spectrographic measurement of the intensity of the absorption band at a wave-length of 328 mμ is now well established as the most accurate method for the determination of vitamin A. The paper gives a comparison between the "blue values" and the spectrographic values for vitamin A obtained on a series of fish-liver oils from various sources.

The spectrographic values are expressed as $E\,\frac{1\text{ cm.}}{1\text{ w/w}}$ 328 mμ, i.e., the coefficient of extinction at a wave-length of 328 mμ of a 1 per cent. w/w solution in chloroform in a thickness of 1 cm.

or $$E\,\frac{1\text{ cm.}}{1\text{ w/w}} = \frac{\log. I_o/I}{cd}$$

where c is the concentration of the solution,
d is the thickness of the cell,
I_o/I is the ratio of the intensities of the incident and emergent light.

Cod-liver Oils

were from various sources (Norwegian, North Sea and Newfoundland) and varied in age, the majority of them being recently prepared. All these oils were low in acid value, so that the interference with the absorption band described by Chevallier and Chabre did not occur. These authors have shown that the free acidity of the oil and in certain cases its pigment (if very concentrated) must be taken into account in consideration of the absorption at 328 mμ, but that when the free acid content of the oil is low, the agreement between the vitamin A found by the spectrographic test and the biological test is fairly good.

The authors show the relation between the "blue values" and the extinction coefficients of the cod-liver oils. It is clear that, even taking into account the possible errors in the determination of the "blue values," which are not likely to exceed 5 per cent., the "blue value" cannot be taken as more than a very approximate measure of the vitamin A content of the oils.

Further, if the results of Coward, Dyer *et al.* are plotted on the same scale, the discrepancies between the two values are even more apparent. Not only is the deviation from a straight line much greater, but their results appear to lie about a line which makes a much smaller angle with the ordinate than in our case.

Halibut-liver Oils

The "blue value" is not even so good a measure of the vitamin A content for halibut-liver oils as for cod-liver oils. This is directly contrary to the statement of Haines and Drummond, who, on the basis of only five oils, concluded that the graph correlating the two values was a straight line and therefore that the "blue value" provided a direct measure of the vitamin A. The discrepancies appearing from our figures far exceed any possible errors in the determination of either the "blue value" or the spectrographic value.

Miscellaneous Fish-liver Oils

The relationship of the "blue value" to the spectrographic value is very similar to that found with cod-liver oils. The high vitamin A content shown by coal-fish oil may be noted. This was also the case with the oil examined last year.

Summary

(1) Further samples of fish-liver oils have been examined by the methods reported in Part I.

(2) A number of fish-liver oils have been examined for vitamin A by the spectrographic method of measuring the intensity of absorption at a wave-length of 328 mμ.

(3) These results have been compared with the "blue values" obtained by the antimony trichloride colour test on the same oils.

(4) It is shown that for none of these oils is the "blue value" determined directly on the oil more than an approximate measure of the vitamin A content.

The authors wish to express their thanks to Allen & Hanburys, Ltd., in whose laboratories this work was carried out.

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TABLE II

Oil	Species	S.g. 15·5/15·5°C.	Ref. ind. 40° C.	Acid value	Saponification value	Iodine value	Blue value	Unsaponifiable matter per cent.
	Oils of Gadidae family							
Cod (mean values) ...	*Gadus morrhua*	0·9262	1·4711	0·65	184·7	162·5	13·5	0·17
Coal-fish (i)	*G. virens*	0·9241	1·4702	3·40	182	146	60	1·40
(Saithe) (ii)	... ...	0·9246	1·4705	0·60	184	152	80	1·56
Haddock	*G. aeglefinus*	0·9295	1·4737	1·60	183	165	2·4	1·22
Ling (i)	*Molva vulgaris*	0·9236	1·4690	2·40	186	147	17·8	0·98
(ii)	*Molva vulgaris*	0·9232	1·4705	1·85	185	147	11·1	0·92
Torsk (i)	*Brosmius brosme*	0·9244	1·4738	2·40	181	148	7 2	3·34
(Brusmer) (ii) ...	*Brosmius brosme*	0·9288	1·4741	1·17	183	186	4·3	1·00
Hake	*Merluccius vulgaris*	0·9251	1·4715	2·40	183	153	14	2·00
	Oils of Elasmobranch fish							
Blue shark	*Carcharias glaucus*	0·9120	1·4685	3·60	155	134	56	13·0
Blue shark	*Carcharias glaucus*	—	—	—	—	—	16·7	20·1
Black shark	?	0·9169	1·4699	0·28	161	135	60	14·8
Shark (North Sea) ...	?	0·9178	1·4676	0·34	168	120	21·6	11·38
Ground shark	*Carcharias littoralis* (?)	0·9194	1·4676	1·20	164	136	16	11·6
Dogfish (i)	*Acanthias vulgaris*	0·9149	1·4666	0·50	166	120	50	11·2
(ii)	*Acanthias vulgaris*	0·9113	1·4662	0·62	161	112	19	14·12
Skate (i)	*Raia batis*	0·9273	1·4732	0·60	184	177	5·0	2·2
(ii)	*Raia batis*	0·9287	1·4745	0·34	183	179	2·6	1·72
(iii)	*Raia batis*	—	—	0·22	—	189	9·4	1·93
	Oils of Flat-fish							
Halibut	*Hippoglossus hippoglossus* (limits) ...	0·9243–0·9246	1·4700–1·4732	0·2–0·3	171–176	122–127	300–4000	8·8–13·3
Turbot	*Rhombus maximus*	0·9257	1·4720	0·22	181	137	230	4·74
Monk-fish	*Lophius piscatorius*	0·9271	1·4726	0·5	181	167	7·9	2·28

The Relationship between the Antimony Trichloride Blue Value of Cod-Liver Oils and that of their Unsaponifiable Fractions

By F. J. DYER, F.I.C., PH.C.

[ABSTRACT]

IN a comparison of the biological, chemical and physical examinations of a series of cod-liver oils made by Coward, Dyer and Morton the chief conclusion reached is that the biological value of the oils gives better agreement with the intensity of the absorption band (at 328 mμ) than with other physical or chemical constants. It was noted, however, that the biological values show somewhat better agreement with the blue values of the unsaponifiable fraction than with the direct blue value of the oils. During the course of routine testing in the Pharmacological Laboratory of the Pharmaceutical Society of Great Britain it began to appear that there is a fairly constant relationship between the two blue values produced by antimony trichloride reagent, one with the oil and the other with its unsaponifiable fraction. The ratio of the direct value to the unsaponifiable value is approximately 1 : 1.5. Thirty-nine samples of cod-liver oil received direct from the manufacturers for routine testing were submitted to the following antimony trichloride colorimetric tests:—

I. Determination of the blue value of the original oils by the method described in the British Pharmacopœia, 1932. This was modified by using dilutions, the blue colour being matched by Lovibond blue glasses between 4 and 6 for a thickness of 1 cm. of oil in the direction of observation. The value thus obtained for each oil was then converted into the customary Carr and Price value (i.e., the blue value of 0.04 gm. of oil).

II. Determination of the blue value of the unsaponifiable fraction of each oil. The method adopted is that of Smith and Hazley, slightly modified as follows:—

Two gm. of oil is weighed into a boiling tube, 1 c.c. of *N*/10 aqueous potassium hydroxide and 5 c.c. of 95-per-cent. alcohol are added, and the mixture heated in a boiling water bath for five minutes, shaking until oil globules disappear. The tube is immediately cooled under the tap, and the soap solution rinsed into a small separating-funnel with 25 c.c. of water, 10 c.c. of alcohol, and the mixture shaken vigorously with 40 c.c. of chloroform. Separation is usually complete in about five minutes and the lower layer is then run into a second separator and the soap solution extracted twice or more with further portions, each of 30 c.c., of chloroform, separation being induced if necessary by adding 0.5 c.c. alcohol and warming the separator horizontally in the steam of a water bath. The soap solution is thus treated with batches of chloroform until a few drops of the chloroformic layer give no blue coloration with arsenic trichloride. Usually three extractions suffice, four being occasionally required.

TABLE I.—COMPARISON OF THE CARR-PRICE COLOUR VALUE OF THIRTY-NINE SAMPLES OF COD-LIVER OIL AND OF THEIR UNSAPONIFIABLE FRACTIONS

Oil	Antimony trichloride blue value		Ratio *y* : *x*
	Oil (*x*)	Non-sap. fraction (*y*)	
1	7·6	12·9	1·700
2	4·4	8·0	1·818
3	28·0	42·0	1·500
4	10·2	19·6	1·921
5	20·6	34·6	1·679
6	9·0	16·6	1·844
7	21·4	36·9	1·724
8	17·1	32·7	1·912
9	23·2	42·8	1·861
10	34·5	49·8	1·443
11	18·2	27·3	1·500
12	23·2	29·7	1·280
13	44·7	73·5	1·644
14	10·7	16·2	1·514
15	19·6	25·5	1·301
16	23·7	34·3	1·447
17	24·7	39·2	1·587
18	30·4	52·5	1·727
19	13·1	19·8	1·511
20	34·7	48·0	1·383
21	22·5	39·5	1·755
22	27·0	42·9	1·589
23	21·5	34·7	1·614
24	18·3	28·5	1·557
25	34·1	57·5	1·686
26	83·6	138·0	1·651
27	25·9	46·2	1·707
28	26·0	42·3	1·527
29	21·5	39·2	1·869
30	15·9	26·3	1·654
31	14·8	24·1	1·628
32	15·2	27·0	1·776
33	10·8	21·2	2·055
34	86·0	100·0	1·163
35	17·4	26·6	1·529
36	21·3	30·1	1·413
37	24·1	36·5	1·514
38	21·4	34·0	1·589
39	26·0	45·0	1·731

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The chloroform extracts, bulked together in the first separator, are washed first with 5 c.c. of water to remove most of the soap, shaking very gently to avoid emulsification, and then with 100 c.c. of $N/200$ hydrochloric acid and finally with 100 c.c. of water.

The chloroform layer is transferred to a small flask, care being taken to leave globules of water behind in the separator, and the solution distilled to small bulk. The residue is rinsed with chloroform into a 10- or 25-c.c. graduated flask, according to the potency of the oil. The antimony trichloride test is carried out on this solution, using dilutions to give blue values matched by Lovibond glasses between 4 and 6. From these readings the Carr and Price value is calculated for the unsaponifiable fraction, but expressing the results in terms of 0.04 gm. of the original oil.

The results given in Table I fulfil the expectation that the values given by the unsaponifiable fraction of 0.04 gm. of the oils would be higher than the value given by 0.04 gm. of the oils themselves.

The remainder of the paper is concerned with a statistical analysis of the probability of correlation between predicted and experimental colour values. The likelihood of the blue value for the unsaponifiable fraction being 161.5 per cent. (i.e., the experimental value for the series) of that of the blue value for the original oil, is shown to be equal for oils of both high and low blue values. The relation between predictable and experimental values may be conveniently summarised in the form of a table (Table II).

TABLE II.—SHOWING THE RELATION BETWEEN EXPECTED AND EXPERIMENTAL VALUES OF THE RATIO OF THE BLUE VALUE (v) OF THE UNSAPONIFIABLE FRACTION OF AN OIL TO THAT OF THE OIL ITSELF (x)

No. of samples	Mean value of		Standard deviation (σ) from mean of log. y–log x	No. of times ratio y/x will lie outside the range					
				1·750–1·490		1·823–1·431		2·060–1–268	
	log. y–log. x	y/x		Theoretically	Found experimentally	Theoretically	Found experimentally	Theoretically	Found experimentally
39	0·2082	1·615	0·0525	1/2	16/39	1/3	11/39	1/22	1/39

Calculation shows that one out of two times the blue value of the unsaponifiable fraction will lie outside 1.75 times and 1.49 times the blue value of the oil, the mean being 1.61 times. That is to say, one out of two times, it will be either greater than 108.7 per cent. or less than 92.5 per cent. of the true value. Conversely, the blue value of the oil, one out of two times, will be either greater than 67.5 per cent. or less than 57.4 per cent. (the mean being 62.1 per cent.) of the blue value of the unsaponifiable fraction of the oil. This means that one out of two times, the blue value of the oil will be at least 8.7 per cent. too high or 7.5 per cent. too low. Applying the analysis to the case of one out of three times the result will be at least 13.2 per cent. too high or 11.2 per cent. too low. Also, one out of twenty-two times, the result will be at least 28 per cent. too high or 21.2 per cent. too low. This is the simplest measure of the degree of inaccuracy that must be accepted in making a determination of the blue value of an oil from the oil itself rather than from the unsaponifiable fraction of the oil. For some purposes this degree of inaccuracy may be immaterial; for other purposes, it may matter greatly.

SUMMARY

(1) Thirty-nine samples of liver oil were tested by antimony trichloride reagent both for the blue value of the oil (x) and of the unsaponifiable fraction (y).

(2) It has been shown that for this series, the blue value of the unsaponifiable fraction is 161.5 per cent. of that of the blue value of the oil itself.

(3) By mathematical analysis, the curve of distribution of the values of log. y—log. x has been shown to be almost normal, to possess only a slight degree of "skewness," and to be of normal height.

(4) This means in practice that the likelihood of the blue value of the unsaponifiable matter prepared by the rapid method of Smith and Hazley, being 161.5 per cent. of that of the blue value of the oil, is equal for oils of high and low blue value.

(5) A simple calculation has been made of the degree of inaccuracy that is unavoidable in making a determination of the blue value of an oil direct, rather than of the unsaponifiable matter. A worker must decide whether this degree of inaccuracy is so great as to make it worth while to carry out the test on the unsaponifiable matter.

Thanks are accorded to Dr. Katharine Coward for the statistical analysis of the results, and to Mr. H. W. Ling for his help in preparing the unsaponifiable fractions of some of the oils.

DISCUSSION

THE CHAIRMAN said that this paper was a valuable continuation of the work communicated by the authors at the Conference the previous year. It was very interesting to find that the type of fish from which an oil had been obtained could be identified by means of the ordinary physical and chemical constants. He asked what technique the authors had used for the antimony trichloride test. The test was described in the British Pharmacopœia, but the detailed instructions were suitable for measurements upon cod-liver oils giving comparatively small blue values. The pharmacopœial minimim standard was 6, and considerable dilution would be necessary with other oils in order to make the technique applicable. In view of the known variations in result which could occur unless precise instructions were given and followed by every worker, it might be well to put on record what was done. The spectrographic test appeared to be now accepted as an accurate measure of the vitamin-A content of these oils. It seemed that the antimony trichloride test on the oils themselves did not agree satisfactorily with the spectroscopic test, even in the case of halibut oil. It had formerly been thought that for this oil there had been agreement. The blue colour, however, was a rough guide to the amount of vitamin A present, and it was interesting to see the very high figures recorded by the authors for halibut-liver oil. The turbot-liver oil came next, with the coal-fish and the shark and dog-fish also giving values much higher than those for cod-liver oil. He asked the authors as to the commercial bearing of these properties revealed by the vitamin-A tests, and whether the oils from the livers of other fish in addition to cod-liver oil and halibut-liver oil were being used. He noted that Mr. Dyer had determined the blue values by the technique for the antimony trichloride test described in the British Pharmacopœia but modified by using dilutions. It appeared now that by comparison with spectrographic result the blue value of the unsaponifiable matter was a better measure of the vitamin-A content than the blue value of the oil itself. The work of the author would inform the analyst who desired to avoid the trouble of separating the unsaponifiable matter for the purpose of performing the test of the degree of inaccuracy which might result. He noted that the author said for some purposes the degree of inaccuracy might be immaterial, but he would like the author to say for what purposes an error of 28 per cent. would be of no significance.

MR. BROOM inquired whether the blue value had been determined on a well-known oil.

MR. SIMMONS asked if the blue value had been ascertained in the case of the Portuguese shark oil analysed by the late Mr. A. Chaston Chapman some years ago.

MR. BRINDLE asked what method was used for determining the iodine value in unsaponifiable oils.

PROFESSOR A. CASTILLE (Louvain) referred to the author's method of taking values.

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Replies

Mr. Evers, who replied first, said that the B.P. test was used in determinations with antimony trichloride. The stronger oils were diluted first. The authors were endeavouring to find whether it was possible to differentiate by chemical methods between some of the fish-liver oils. Their research was largely based on the examination of unsaponifiable matter, and the method used for the determination was one recently published by a subcommiteee of the Society of Public Analysts. The British Pharmacopœia ordered oil from the liver of the cod, but other pharmacopœias allowed related species. In practice others were largely used, and there was no analytical method for distinguishing between them. The authors had not examined the oil from the Portuguese shark, which, on account of its indigestibility, was of no interest medicinally. There was a possibility of destroying some of the vitamin A in extracting unsaponifiable matter. He could not believe that there was likely to be any serious error in the determination of blue values in the same laboratories with the same workers. Other sterols gave a blue colour with antimony trichloride. The authors had not compared their spectrographic results with other people's.

Professor Burn, who also replied, said that in preparing Mr. Dyer's paper the physical constants had been very fully made. What did Mr. Evers consider the error was in the spectrographic method?

Mr. Evers suggested not more than 10 per cent.

Professor Burn, concluding his reply, thought there was probably not more inaccuracy in work on unsaponifiable matter than in work on oils. It must be remembered that cod-liver oil was used for other things than its content of vitamins A and D; the official oil, he suggested, should be limited to cod as specifically as possible.

The next paper taken, read by Mr. T. Dewar, dealt with:—

A Comparative Study of the Anatomy of Buchu Leaves

By T. E. Wallis and T. Dewar

[Abstract]

The British Pharmacopœia requires that buchu leaves shall consist of the leaves of *Barosma betulina* (Thunb.) Bartl. and Wendl. The leaves of *B. crenulata,* Hook and B. *serratifolia,* Willd. are official in the U.S.P. X; whilst the leaves of several other species of *Barosma* appear from time to time on the drug market. A re-investigation of authenticated leaves of *B. betulina,* specially obtained from the National Botanical Gardens of South Africa, showed that existing records are substantially accurate; but some errors were noted. In particular it was found that the mucilage layer is actually in the nature of a thickening laid down upon the inner wall of the epidermal cells and separated from the lumen of the cell by a thin cellulose membrane. The U.S.P. X and various text-books still incorrectly describe this as a hypodermis. Investigation of the anatomy of the leaves of various other species of *Barosma* revealed a number of characters which are of diagnostic value in regard to powdered buchu. Each character is considered separately and discussed in relation to its value as a means of distinguishing between the different kinds of

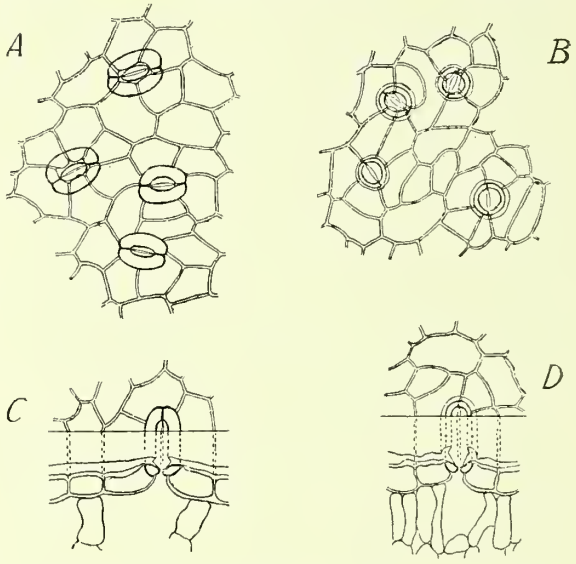

Fig. 1.—Stomata of two species of *Barosma.* A and C, Lower epidermis of *B. betulina.* B and D, Lower epidermis of *B. Bathii.* In both A and B, the two upper stomata show how the walls of the adjacent epidermal cells extend beneath the guard cells; this detail is omitted elsewhere. C and D, diagrams showing the correspondence between the appearances of the details of the stomata as seen in transverse section and in surface view.

buchu leaves. The dimensions of the stomata of official buchu leaves has proved of value in differentiating from all other leaves of *Barosma* under examination. The table below makes this apparent.

From the table it can be seen that the maximum lengths of the stomata of all the unofficial leaves are less than that of *B. betulina,* and hence total substitution of the leaves of a different species of *Barosma* for

Table I.—Lengths of Stomata

Species	Source of Leaves	Number of Leaves examined	Number of measurements made	Range of length microns	Percentage greater than microns 38·4
B. betulina	Herbarium (1919)	3	126	23·7–45·6	—
B. beulina	*Herbarium (1928)	3	87	29·6–46·2	—
B. betulina	†Commercial leaves (1932)	No. 60 powder	300	30·0–48·6	52·7
B. betulina	†Commercial leaves (1932)	No. 60 powder	300	25·7–51·6	45·3
B. betulina	*Dried leaves specially sent from S. Africa (1932)	No. 60 powder	300	26·0–50·6	30·7
B. serratifolia var. latifolia	*Herbarium (1928)	6	108	25·2–35·5	0
B. serratifolia var. longifolia	Commercial leaves (no date)	6	108	22·9–38·4	0
B. crenulata var. latifolia	Herbarium (1913)	6	108	27·4–36·6	0
B. crenulata var. longifolia	Herbarium (1913)	6	108	29·0–38·3	0
B. crenulata var. angustifolia	Herbarium (1913)	6	108	25·9–38·4	0
B. pulchella	Commercial leaves (1907)	15	270	27·7–40·7	9·6
B. venusta	Commercial leaves (1911)	10	270	22·2–42·5	0·4
B. ovata (hairy leaves)	Commercial leaves (no date)	No. 60 powder	100	24·5–37–1	0
B. ovata (almost glabrous leaves)	*Leaves gathered fresh and preserved in alcohol (1928)	6	100	26·2–36·2	0
B. Bathii	Commercial leaves (no date)	10	270	25·1–35·8	0
B. Peglerae	*Herbarium (1928)	6	100	23·9–30·1	0
B. Peglerae	*Leaves gathered fresh and preserved in alcohol (1928)	6	100	24·3–30·4	0

The specimens indicated with an asterisk (*) were supplied by Professor Compton, and that with a dagger (†) by Mr. G. R. A. Short. All the others are from the museum of the Pharmaceutical Society.

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those of the official one can be readily detected by making use of this character.

Detailed determinations show that it is impossible to state definitely that a given sample of powdered buchu (from *B. betulina*) is entirely free from admixture with *B. crenulata* or *B. serratifolia* by using stomatal length as diagnostic criterion. Any result ranging between 28 and 56 per cent. of stomata exceeding 38.4 microns in length must be accepted as indicative of a genuine powdered buchu. The stoma of *B. Bathii,* Dummer, is quite different in surface view from that of other species of *Barosma.* The form and position of the guard cells result in two concentric circles separated by about four microns (see Fig. 1, B and D). The outer circle corresponds to the outer margin of the guard cells and the inner outlines the external entrance to the vestibule, and their appearance creates an erroneous impression that the guard cells are exceptionally narrow. The stomata of *B. betulina* are illustrated for comparison. The palisade-ratio was determined as it seemed possible that it might be of value in distinguishing between the various species of *Barosma.* The choice of a clearing agent presented difficulty owing to the presence of water causing swelling of mucilage and separation of epidermis from palisade parenchyma. Chloral phenol (equal parts by weight of chloral hydrate and phenol) was found to be a satisfactory anhydrous clearing agent, the material being covered with reagent and heated on a water-bath for about fifteen minutes. The total number of palisade cells beneath four upper epidermal cells (see Fig. 2) could be counted easily, and this number divided by four gives the recorded palisade-ratio. It was found that the palisade-ratio varied in different parts of the same leaf and that this variation is independent of the position on the leaf. The results obtained for the species examined are as follows:—

to 2,050 microns, except ones in the apices, which may be up to 3,170 microns. The bundles, including the

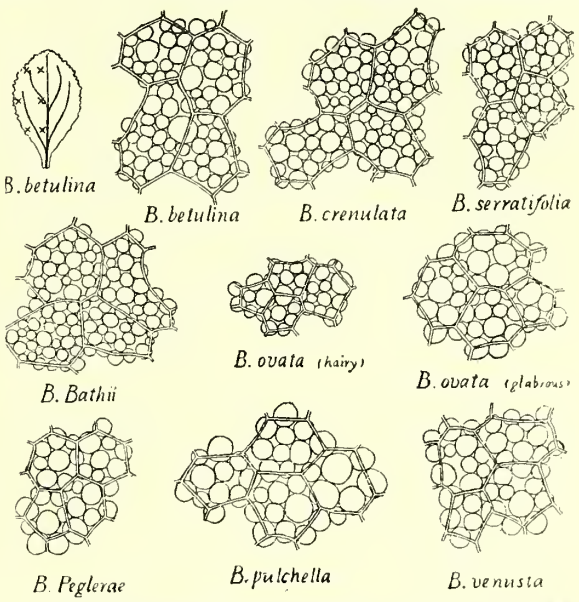

FIG. 2.—Palisade-ratio determinations. Leaf of *Barosma betulina* showing the regions, each marked by a ×, used for making the determinations. Drawings of the 8 species of *Barosma* examined showing in each case a group of four upper epidermal cells and the underlying palisade cells.

TABLE II.—PALISADE-RATIOS

Species	Source of Leaves	Number of Leaves examined	Number of determinations made	Range of palisade ratio	Percentage of determinations less than 10
B. betulina	†Commercial leaves (1932)	5	28	10 –26	0
B. betulina	Herbarium (1919)	5	24	11 –22	0
B. betulina	*Herbarium (1928)	3	13	16·5–26	0
B. serratifolia var. latifolia	*Herbarium (1928)	4	40	8·5–17·5	7·5
B. serratifolia var. longifolia	Commercial leaves (no date)	5	55	9 –18·5	1·8
B. crenulata var. latifolia	Herbarium (1913)	3	18	9·5–18	5·6
B. crenulata var. longifolia	Herbarium (1913)	3	18	9 –19	11·1
B. crenulata var. angustifolia	Herbarium (1913)	3	18	8·5–18	5·6
B. pulchella	Commercial leaves (1907)	20	100	6 –16	40·0
B. venusta	Commercial leaves (1911)	7	34	5 –12·5	85·3
B. venusta	Herbarium (1911)	4	32	6 –12·5	65·8
B. ovata (hairy leaves)	Commercial leaves (no date)	9	40	5 –14·5	62·5
B. ovata (almost glabrous leaves)	*Leaves gathered fresh and preserved in alcohol (1928)	4	40	6 –14	65·0
B. Bathii	Commercial leaves (no date)	4	23	8 –24	4·3
B. Peglerae	*Herbarium (1928)	2	14	6 –10	85·7
B. Peglerae	*Leaves gathered fresh and preserved in alcohol (1928)	3	36	6 –11·5	80·6

The specimens indicated with an asterisk (*) were supplied by Professor Compton, and that with a dagger (†) by Mr. G. R. A. Short. All the others are from the museum of the Pharmaceutical Society.

From an inspection of the table, it is evident that this character provides a means of distinguishing the powdered leaves of *B. pulchella, B. venusta, B. ovata,* or *B. Peglerœ* from those of *B. betulina.* The palisade-ratios of *B. serratifolia, B. crenulata* and *B. Bathii* have approximately the same values as for *B. betulina ;* and consequently are of little use in detecting their presence when substituted for powdered leaves of *B. betulina.* Partial adulteration of a sample of powdered buchu with the leaves of *B. pulchella, B. venusta, B. ovata,* or *B. Peglerœ* is detected by making a number of determinations of the palisade-ratio and finding whether any values are less than the minimum limit of 10 for *B. betulina.* The leaves of *B. Bathii* Dümmer are distinguished by the presence of bundles of moderately lignified fibres in the margin, an oil-gland being present between successive bundles. There is no gland in the apex, which is strengthened by a similar bundle of fibres, but differing from the others in length and in having an almost semicircular outline. The bundles vary in length from 430 apical ones, vary in width from 100 to 140 microns. The bundles are easily recognised when the powdered leaves are examined microscopically. The marginal fibres were isolated by an oxidising disintegrating reagent (dilute chromic and nitric acids). They are intermediate between fibres and stone cells (from 165 to 380 microns in length). The pericyclic fibres are unlignified and are separated by hydrolysing with aqueous potash (5 per cent.). These are much longer (830 to 2,400 microns). The leaves of *B. ovata* exhibit wide difference in hariness, but hairy and almost glabrous varieties agree in stomatal lengths and palisade-ratios. The leaves of *B. venusta,* Eckl. and Zeyh. differ from all the other buchus in fluorescing strongly in ultra-violet light. It was found that shaking the powdered leaves with alcohol gives on filtration an extract exhibiting a bright blue fluorescence which enables detection of the presence of 0.5 per cent. of this unofficial buchu in admixture with the powder of official buchu.

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A key for the identification of the powdered leaves of species of *Barosma* is as follows:—

(1) An alcoholic extract of the powder exhibits a strong blue fluorescence in ultra-violet light. *B. venusta.* This can be confirmed by the palisade-ratio, which is 5–12·5.

(2) No blue fluorescence produced when an alcoholic extract is examined in ultra-violet light.

(A) Bundles of moderately lignified fibres present. *B. Bathii.* This can be confirmed by the distinctive type of stoma.

(B) Bundles of moderately lignified fibres absent.

(*a*) Stomata never exceeds 38·4 microns in length.

i. Palisade-ratio (using four contiguous upper epidermal cells, see above) is never less than 8 ... ... } *B. serratifolia* *B. crenulata.*

N.B.—These two species cannot be distinguished from one another when in the form of powder.

ii. Palisade-ratio is less than 8 to the extent of 20 to 30 per cent. of the determinations.

α Numerous trichomes present ... *B. ovata* (hairy variety).

β Only one or two trichomes present in each mount ... ... } *B. Pegleræ.* *B. ovata* (almost glabrous variety).

N.B.—The leaves of *B. Pegleræ* and of the almost glabrous variety of *B. ovata* cannot be distinguished from one another when in the form of powder.

(*b*) A number of stomata exceeding 38·4 microns in length is always present.

i. Palisade-ratio is never less than 10 *B. betulina.*

ii. Palisade-ratio is less than 10 to the extent of about 40 per cent. of the determinations ... ... *B. pulchella.*

Discussion

The Chairman congratulated the authors on the very good work set out in this paper, particularly on the drawings, which were a record of painstaking and accurate work. After what he had said already that morning, he felt that he ought to be circumspect in what he said about the study of plant structure, but the authors would not misunderstand him. The detailed study of those drugs which continue to be used is required, and the paper was a good example of the methods used and the result achieved. He asked the authors whether the powdered buchu leaves were much used. He was accustomed to see only the whole leaf, in which case the macroscopic characters were sufficient for identification.

Mr. Wallis stressed the importance of the paper commercially.

Mr. Short said buchu is one of the few drugs which does not appear to be dying out. Apart from the commercial value this paper would be of great value to research students.

Mr. Rae (Liverpool) inquired if other samples of buchu had shown mucilage cells, the value of which he believed to be of great therapeutic value.

Mr. Chamings asked for further information regarding the use of light in the practical examination of other drugs.

Mr. Dewar, in the course of his reply, said that all eight species contained mucilage, and he believed five others did also. Regarding ultra-violet light, there is considerable evidence of its value in testing drugs.

The next paper was:—

The Stability of Aqueous Solutions of Gallotannic Acid

With Especial Reference to the Tannic Acid Treatment of Burns

By W. A. Woodard and A. N. Cowland

[Abstract]

In the past many have considered it necessary to use comparatively fresh solutions of tannic acid for the treatment of burns, on the assumption that gallotannic acid hydrolyses in aqueous solution and is converted into gallic acid and glucose. In this paper an effort has been made to show that hydrolysis in aqueous solutions of gallotannic acid takes place extremely slowly in the absence of mould fungi (i.e., in the absence of enzymes). The mould fungi can be eliminated by the addition of small quantities of a suitable preservative, which simultaneously functions clinically as an antiseptic.

Hydrolysis in the Absence of Enzymes

The production of hydrolytic enzymes by the action of mould fungi was prevented by adding thymol 1 part in 2,000 to each of the solutions. The rate of deterioration was determined as follows:—

(1) By quantitatively estimating the gallotannic and gallic acid contents of solutions.

(2) By observing changes in the hydrogen ion concentration of solutions.

(3) By observing changes in the specific rotation of solutions.

Absorption, precipitation and oxidation methods failed to yield consistent results. The colorimetric method adopted gave good results and is briefly described. It depends upon the reaction between ferrous sulphate and gallotannin in the presence of a tartrate, to form a soluble compound which, unlike the ink produced by ferrous sulphate alone, is fairly stable. The colour ranges from reddish violet in dilute solution to bluish violet in more concentrated solution, and its intensity is proportional to the amount of tannin substance present. The reaction is specific for the pyrogallic grouping. In order to obtain the maximum intensity of colour a buffer solution must be employed, and recommended for this purpose is 5 to 10 c.c. of 10 per cent. ammonium actate solution, and if turbidity be present the further addition of varying amounts of dilute ammonia (about $N/4$). The gallic acid used as a standard for comparison purposes contained 9.8 per cent. of moisture, and its purity determined colorimetrically by comparison with pyrogallol was 100 per cent. The standard gallic acid solution consisted of 1 c.c. of 0.1 per cent. solution of this pure gallic acid (due allowance being made for moisture), plus 2 c.c. of the ferrous tartrate reagent, and the necessary amount of buffer solution in 100 c.c. of water. The resulting colour was matched against that produced by a suitable dilution of the unknown substance in solution. The gallotannic and gallic acids were first estimated together in terms of pure gallic acid. The gallotannic acid was then precipitated by adding slight excess of a solution of quinine hydrochloride, allowing to stand for five minutes, filtering, washing well, and making the filtrate and washings up to a definite volume with water. The filtrate was then estimated for gallic acid. A difficulty was caused by the filtrates from the quinine tannate being colloidal in nature. After several experiments this was overcome by using as an electrolyte a strong solution of pure anhydrous sodium sulphate. Four samples obtained from different drug houses have been examined by the method described. The results obtained after storing solutions for six months were almost identical. Therefore, it was decided to record the initial analyses in full, but to restrict the results obtained after storage, and after treatment by various processes of heat to one sample only. The sample chosen for this purpose was the one at that time in use in St. Thomas's Hospital. Solutions were stored at ordinary laboratory temperature (60° to 65° F.), and, as far as the authors have been able to determine, ordinary light is not detrimental to solutions. Also the small amounts of alkali present in ordinary glassware produced errors which were negligible. Solutions darkened somewhat in colour on keeping, and the presence of alkali in appreciable quantity accelerated this change, presumably owing to the phenolic nature of gallotannin. It was found that the change in colour could be prevented by saturating solutions of gallotannic acid with carbon dioxide, but solutions which had been treated in this manner and kept for definite periods showed when examined by the method described below no higher gallotannic acid content than solutions in which the colour had been allowed to develop. The

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changes in hydrogen ion concentration were determined by the electrometric method. In examining solutions for sugar the gallotannin was first precipitated with lead acetate, the excess lead removed with H_2S and the filtrates examined polarimetrically. Qualitative tests using Fehlings solutions, and fermentation with yeast were also applied. The following results are typical of those obtained, A being the particular sample in use in St. Thomas's Hospital and the one used for exemplifying the authors' results:—

	A	B	C	D
	Per cent.	Per cent.	Per cent.	Per cent.
Water	11·8	7·5	9·4	6·2
Total tinctogenic value (in terms of gallic acid)	50·0	61·4	48·5	58·2
Gallic acid	12·5	10·4	10·2	11·1
Gallotannin	37·5	51·0	38·3	47·1
Non-tinctogenic substances ...	38·2	31·1	42·1	35·6

Sample A was dextro-rotatory in aqueous solution $[a]_D^{20^\circ C.} = 4.52^\circ$. No free glucose was detectable in the original solid, and a fresh 1 per cent. solution gave a PH of 3.63. A corresponding solution of the pure gallic acid used for comparison purposes gave a PH of 2.91. Table I shows two distinct types of results, (1) deterioration in dilute and concentrated solutions after storage for six months; (2) deterioration in dilute and concentrated solutions after treating by various processes of heat. Solutions were stored at the clinical strength, namely, 2 per cent., and also at a concentration of 20 per cent., suitable dilutions being made from these stock solutions for the purpose of carrying out the quantitative determinations.

Table I

Solution	Age and Strength of Solution	Method of Treatment	Total Tinctogenic Value in Terms of Gallic Acid	Gallic Acid	Gallotannin	Increase in Gallic Acid	PH	$[a]_D^{20^\circ C.}$	Qualitative Tests for Sugar
1 ...	Fresh 1 per cent. ...	—	50	12·5	37·5	—	3·63	+4·52°	Negative
2 ...	Fresh 1 per cent. ...	Incubated at 38° C. for 12 hrs.	50·06	12·62	37·44	0·12	3·63	+0·02°	Negative
3 ...	Fresh 1 per cent. ...	Refluxed for 1 hr.	50·185	12·9	37·285	0·4	3·62	+0·03°	Negative
4 ...	Fresh 1 per cent. ...	Hydrolysed for 1 hr. with 1 per cent. HCL.	51·9	16·75	35·15	4·25	3·4	+1·2°	Positive
5 ...	Fresh 1 per cent. ...	Tyndallised	50·27	13·1	37·17	0·6	3·62	+0·03°	Negative
6 ...	Fresh 1 per cent. ...	Autoclaved 10 lb. per sq. in. for 30 minutes.	51·06	14·81	36·25	2·31	3·5	+0·7°	Slight positive
7 ...	Fresh 20 per cent. ...	Autoclaved as above	51·08	14·94	36·14	2·44	3·5	+0·8°	Slight positive
8 ...	6 months old 1 per cent.	Preserved with 1 in 2000 thymol	50·03	12·54	37·49	0·04	3·63	+0·02°	Negative
9 ...	6 months old 20 per cent.	Preserved with 1 in 2000 thymol	50·04	12·6	37·44	0·1	3·63	+0·02°	Negative

These results show how difficult it is to hydrolyse an average sample of gallotannic acid. Solution No. 4 is the only one showing any appreciable increase in gallic acid, and that was after acid hydrolysis. Solution No. 8, six months old, shows practically no increase. No. 9, a six months' old solution kept in concentrated form, also shows no increase.

Hydrolysis in the Presence of Enzymes

Two 0.1 per cent. solutions of gallotannin (due allowance being made for 12.5 per cent. of gallic acid), were inoculated with moulds which had grown in stronger solutions, the liquids being exposed in loosely covered flasks at ordinary laboratory temperature, 60° to 65° F.). At two-day intervals, 1 c.c. of each solution was withdrawn and its colorimetric equivalent determined in terms of pure gallic acid. In one instance the hydrolysis proceeded to the anticipated extent, the gallotannin solution doubling its tinctogenic power in four to six days. In the other solution the tinctogenic power increased slightly during the first four days, and then remained quite stable neither increasing or decreasing. After the sixth day the first solution began to lose in tinctogenic value, continuing to do so until after three weeks, during which time it had become progressively yellow, it gave hardly any colour with the reagent. The results are given below (Table II), the values being expressed in comparison with a 1 per cent. solution.

In the first solution, therefore, the hydrolysis had resulted in almost complete destruction of the gallic acid formed. In the second case, after repeated experiments the authors would tentatively put forward the suggestion that a substance has been produced intermediate between gallotannic and gallic acids, resulting in interference with the colour reaction and thus causing erroneous readings. The moulds from these two experiments were cultured, using an agar medium containing tannin. In the case of A, growth was observed below the surface, but nothing above, whilst B yielded a typical surface growth. This would seem to indicate that the results obtained were due to the activities of two distinct types of mould fungi.

The Choice of a Suitable Antiseptic

In order to preserve solutions from mould growth, and at the same time to introduce a substance into the damaged area with a view to diminishing the chance of sepsis during the process of epithelialisation, it was necessary to experiment with a number of antiseptics. Perchloride of mercury at a strength of 1 in 2,000 gives good results in solutions which are going to be used fairly quickly, but after one to two months greyish black deposits have been observed at the bottoms of the stock bottles. Since the un-ionised mercury compounds are said to be much feebler and slower in their antiseptic action than the ionised compounds, it would seem that perchloride of mercury fails where preservation over a long period is desired.

This evidence was confirmed bacteriologically by adding different dilutions of the filtrates to suspensions of mixtures of streptococci and staphylococci. A 2 per cent. sugar medium was used, large volumes being employed in order to avoid error owing to the carrying over of traces of antiseptic in sowing the culture tubes. Controls were put up using dilutions of freshly-prepared gallotannin solution containing 1 in 2,000 of perchloride of mercury. The results showed a marked decrease in antiseptic action. Numerous antiseptics have been tried, most of them failing either on account of incompatibility or because they were too irritant in the concentration at which they were effective against bacteria. Beta-naphthol, thymol, and acriflavine, have been tried. The first two proved to be too irritant in germicidal concentrations, and acriflavine at a dilution of 1 in 1,000 failed to inhibit mould growth. Recently, a

Table II

A	Days	2	4	6	8	10	12	14	16	18	20
	Gallic acid equivalent	50	—	98	85	51	47	—	32	—	17
B	Days	2	4	6	8	10	12	14	16	18	20
	Gallic acid equivalent	50	55	—	—	55	—	—	—	55	—

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mixture of ortho meta and paracresol in the form of purified cresol has been undergoing clinical trial, and we are glad to record that at a concentration 1 in 250 it has given excellent results. Owing to its very recent introduction it is not possible as yet to give definite statistics concerning the use of this antiseptic. It is enough to be able to say that purified cresol holds promise of proving to be the ideal substance for preserving and rendering solutions of gallotannin antiseptic over long periods. It has been possible to show that purified cresol at a dilution of 1 part in 250 is effective after four hours against *staphylococcus aureus,* and against the beta-hæmolytic and gamma streptococcus. The latter organisms have been considered by some workers to be the cause of sepsis during the treatment of burns.

Tannic Acid Tablets

The production of a good tablet presents several outstanding difficulties, which have been enumerated below, together with a suggested formula and method of manufacture. Thanks are due to Mr. J. M. Moore, Ph.C., for co-operation received in making these tablets. Since each table had to consist chiefly of gallotannic acid the amount of diluent to be incorporated was necessarily restricted. Furthermore, the intractibility of gallotannin on compression gave it a strong tendency to stick to the punch and die of the machine. The greatest difficulty was provided by the choice of a suitable excipient. Aqueous liquids gave a sticky mass which could not be granulated, while volatile organic solvents, although satisfactory for moistening, yielded granules which after drying fell to powder. Theobroma and stearin emulsions were unsuitable because they left insoluble residues on drying. After numerous experiments, simple syrup or mucilage of acacia in defined quantities were found to give the most satisfactory results. The choice of lubricant was restricted to a soluble substance, boric acid being found satisfactory providing it was added to the granules after drying. If it was added before drying a swollen mass, soft in consistency and dark in colour, was obtained, this being due possibly to some interaction between the boric acid and gallotannic acid. Lactose was chosen as the diluent because it was water soluble, practically inert, and easily incorporated. Perchloride of mercury, 1 part in 2,000, seems to work well, and no reduction of the mercury corresponding to that found in solutions has yet been recorded. The following formula has given satisfaction in practice:—

Tannic acid	2 oz.
Mercuric chloride	25 gr.
Lactose	200 gr.
Boric acid	300 gr.
Syrup *or*	A sufficiency
Mucilage of acaciæ	

Carefully mix the mercuric chloride and tannic acid, triturating gently with the required amount of syrup or mucilage of acacia (approx. 180 minims of either). Dry and pass through a No. 16 sieve. Add the boric acid plus sufficient lactose to make 100 tablets, each weighing 15 grains, and compress lightly. Preliminary moistening with ether before adding the excipient was found to give slightly better results, but attempts to granulate in the moist condition was unsuccessful. Tablets obtained by this method were of a pale buff colour, and firm in consistency. They were easily crushed, and readily soluble in warm water to give an almost clear solution. One tablet crushed and dissolved in one fluid ounce of warm water yields an approximately 2 per cent. solution. It has been suggested that mucilage of acacia is unsuited as an excipient because it contains an oxidase enzyme, but we have not been able to detect any deterioration in the tablets after storage, and therefore think that possibly the mercuric chloride acts as a paralyser.

Summary

General Conclusions

The rate of deterioration in aqueous solutions of gallotannic acid preserved at a temperature of 60-65° F. is negligible over a period of six months. The rate of deterioration is not influenced by the concentration of solutions. A small quantity of suitable antiseptic and preservative is needed in solutions. Perchloride of mercury has been shown unsuitable for this purpose, and on the evidence quoted above purified cresol 1 part in 250 might conveniently replace the mercury compound.

Clinical Applications

Stock solutions in concentrated form, and occupying the minimum amount of space, could be kept in hospital dispensaries and in the surgeries of general practitioners. Those engaged in giving first aid treatment would be able to carry in their outfits a conveniently small stock of concentrated solution, which when diluted with water to the required strength would yield sufficient liquid to treat quite a large surface. A suggested strength at which concentrated solutions might be kept is 10 per cent. A solution of this strength would require diluting with five times its volume of warm water before application to a burn. It would be possible for members of the public to purchase from their local pharmacist a bottle of tannic acid solution for burns and keep it by them ready for use in their own homes in cases of emergency. The possibility of sepsis arising during the treatment of a burn might be considerably lessened by rendering the solution to be applied as sterile as possible. This could be accomplished by a judicious combination of low temperature stabilisation and chemical sterilisation.

Discussion

The Chairman said that the authors had done a useful service in proving that solutions of gallo-tannic acid were stable so long as moulds were not allowed to grow, and it was interesting that the authors were able to communicate the results on antiseptics which supported the recommendation of a 1 in 250 proportion of cresol. The clinical finding that an old solution is unsatisfactory by the spray method because the crusts produced a softer is still left unexplained, but the compressed method is interesting as showing that by this method a solution which had been stored could be used. The formula for tannic acid tablets would be a useful one and provide a means for first-aid treatment, although the authors themselves recommend keeping a quantity of concentrated solution containing an antiseptic which could be diluted at the time of use.

Dr. Crossley Holland described the paper as a very valuable contribution to the presentation of tannic acid. The difficulty had been to present it as a sterile layer: as it was impermeable, sterility was very important. He was sorry the authors had found acriflavine unsatisfactory: it lessened tendency to shock, and was a local analgesic. Perhaps an emulsion of it might be devised.

Mr. T. Edward Lescher congratulated the authors, describing the paper as one of the few of practical value emanating from hospitals.

Mr. Ware differed from the authors' statement of results obtained in presence of a tartrate.

Mr. Chamings inquired regarding the effect of sodium bicarbonate on the solution.

Mr. Treves Brown asked concerning the reduction of mercuric chloride in a solution prepared from the tablets.

Mr. Berry remarked that he had used sucrose in place of lactose. He obtained good granules with alcohol. Pressing lightly was essential. He wondered why the tannin from hamamelis had not been tried.

Mr. Davis said he would like to see at least one paper from a hospital every year. He could not recollect a pathogenic organism with a reaction as low as 3.5; in other words, was a solution of tannic acid autogenously sterile?

Dr. Ewing inquired if para-hydroxybenzoic acid had been tried.

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MR. WOODARD, in his reply, said acriflavine was not a success, as he had stated in his paper. As to Mr. Ware's question he had not much to say (the use of small quantities of tartrate and 10 per cent. of acetate). Without using a buffer solution it was impossible to get great depth of colour. As regarded the use of bicarbonate and tannic acid, the effect was to produce a softer crust. He had not tried sucrose for the tablets, and had used the method advocated at the last Conference for determining mercuric chloride. He had found appreciable reduction in a solution made from the tablets and kept for a time. He had not had experience of tannin from hamamelis, but agreed that the tablets should be lightly compressed. He had no experience with the esters of hydroxybenzoic acid.

The Section then adjourned.

Science Section

Tuesday Afternoon

The first paper to be taken after lunch was read by Miss Smelt on:—

The Keeping Properties of Liquor Arsenicalis

By E. M. SMELT, B.PHARM., PH.C.

[ABSTRACT]

ALMOST immediately after the publication of the B.P., 1932, it became evident that the formula for arsenical solution did not yield equally successful results in all hands. Criticisms were made that moulds grew in the solution and that an offensive odour developed. The deposition of crystals of arsenic trioxide was also reported. On the other hand, several pharmacists reported that they had made the solution and kept it for various periods without change and had, in fact, experienced no trouble. The two arsenical solutions of the B.P., 1914, have not given cause for similar complaints. The suggestion has been made that if the potassium hydroxide used in preparing liquor arsenicalis were replaced by sodium hydroxide the tendency to the growth of moulds would disappear.

An investigation was undertaken to show whether it would be possible to prepare a neutral solution of arsenic which would not be subject to the growth of moulds and would not deposit crystals of arsenic. Arsenic trioxide was obtained from several different sources. The B.P. tests for purity and assay were applied to each sample, and five which complied with the tests were used for the preparation of solutions. Various modifications of the B.P. process were tried and different methods of storage were employed. Solutions were prepared strictly in accordance with the B.P. instructions. Potassium hydroxide, hydrochloric acid, and distilled water, which complied with the B.P. tests for purity, were used. In observing the growth of moulds, the first appearance of a small strand or tuft was noted. In many cases, the development of mould proceeded little beyond this stage and the conspicuous felted mass, described by some correspondents, was not observed in any solution. Six specimens were stored in completely filled, unopened, corked bottles. (The author records their behaviour by means of a table.) In order to employ conditions similar to those found in a dispensary, eight specimens were stored in partly filled, corked bottles, which were frequently opened and shaken. (Their behaviour is also tabulated.) Two specimens were stored under dispensary conditions, but in glass-stoppered bottles. (A table gives details of their behaviour.)

The possible inhibitive action of sodium hydroxide on the growth of moulds was investigated by preparing specimens in which the solution of potassium hydroxide was replaced by freshly prepared solution of sodium hydroxide (approximately 3.6 per cent. w/v of NaOH). The sodium hydroxide used complied with the B.P. tests for purity. Some solutions were also prepared in which diluted bench solution of sodium hydroxide, several weeks old, was used. A table shows the behaviour of those stored in full, unopened corked bottles; other tables give the particulars of the specimens stored under dispensary conditions in corked bottles, and in glass-stoppered bottles. Liquor arsenicalis prepared by the B.P. method of neutralisation to litmus was found to have a PH value varying between 6.6 and 7.4. A series of solutions was, therefore, prepared in accordance with the B.P. formula, with the difference that the final products were adjusted to definite PH values varying between 4.0 and 9.0 by the addition of dilute hydrochloric acid or of solution of potassium hydroxide. The method of storage used was in each case the same, in partly filled glass-stoppered bottles, which were frequently opened and shaken, except in the case of the solutions adjusted to PH 7.8. It was thought at the time that adjustment to PH 7.8 might have the desired effect of preventing the formation of moulds and deposits. Storage in corked bottles and in rubber-stoppered bottles under dispensary conditions was also tried at this PH. (A table shows the behaviour of specimens of different PH kept in partly filled glass-stoppered bottles which were frequently opened and shaken.)

Specimens were prepared according to the B.P. formula but containing the following preservatives:— (i) 3-per-cent. v/v of compound tincture of lavender, B.P. 1914; (ii) 3-per-cent. v/v of spirit of lavender, B.P. 1914; (iii) 1.5-per-cent. v/v of spirit of lavender, B.P. 1914; (iv) 0.5 per cent. v/v of spirit of lavender, B.P. 1914; (v) 3-per-cent. w/w of spirit of lavender (D.A.B. VI) and 12-per-cent. w/w of alcohol (90 per cent.) as in liquor kalii arsenicosi, D.A.B. VI; (vi) 0.25-per-cent. v/v of chloroform. Each specimen was stored in a partly-filled corked bottle, which was frequently opened and shaken. The record of the behaviour on storage of these specimens is given in the following table:—

Specimen Number	Preservative added	Behaviour on Storage
A4 (control)	None	No moulds after 5 months
A15	3 per cent. v/v tinct. lavand co.	No moulds after 5 months; red flocculent deposit
A16	3 per cent. v/v spt. lavand.	No moulds after 5 months; separation of oil globules
B3 (control)	None	Mould present after 3¾ weeks
B21	3 per cent. v/v tinct. lavand. co.	No moulds in 5 months; red flocculent deposit
B22	1·5 per cent. v/v spt. lavand.	No moulds in 5 months; separation of oil globules
B28	0·5 per cent. v/v spt. lavand.	No mould in 4 weeks
B23	3 per cent. w/w spt. lavand. D.A.B. VI.	No moulds in 5 months
	12 per cent. w/w alcohol (90 per cent.)	Opalescent solution
B25 (control)	None	Mould present after 2 weeks
B24	0·25 per cent. v/v $CHCl_3$ ...	No moulds in 4 months

In order to ascertain whether the freedom from moulds of liquor arsenicalis B.P., 1914, was due to the presence of compound tincture of lavender or to the alkalinity of the solution, specimens were prepared in accordance with the B.P., 1914, formula, but omitting the compound tincture of lavender. In a table details are given of two specimens, stored in completely filled unopened, corked bottles, and a further table refers to specimens which were stored in partly-filled corked bottles, which were frequently opened and shaken.

In order to determine whether liquor arsenicalis with a PH value slightly greater than 7.0 was incompatible with liquor strychnini hydrochloridi, diluted and undiluted mixtures of the two solutions were prepared. The diluted mixtures contained the maximum doses in half a fluid ounce. In the undiluted mixtures the two solutions were mixed in the same proportions, but no water was added. Arsenical solutions with PH values of 7.1, 7.6, 8.0, and 9.0 were used. No crystallisation of strychnine was observed in any of the diluted mixtures during a period of two to three months, even when arsenical solution of PH 9.0 was used. In the undiluted mixtures, crystals of strychnine separated at once when arsenical solution of PH 9.0 was used; with the arsenical

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solution of PH 8.0 crystallisation occurred after two to three weeks, but with the solution of PH 7.6 no crystallisation was observed. It became evident at this stage of the investigation that in order to obtain a satisfactory product, the PH of liquor arsenicalis must be adjusted to PH 4.0, or preferably to a lower value. For this purpose neutralisation to methyl orange instead of to litmus was employed, by which method a solution of PH 3.4 was obtained. In addition, other solutions were prepared and adjusted to PH 3.0, 2.5, 2.0 and 1.5. The suggestion that the growth of moulds in liquor arsenicalis was induced by traces of nitrate present as impurities was next investigated. The potassium hydroxide, sodium hydroxide and hydrochloric acid were found to be free from nitrates, but each specimen of arsenic trioxide gave a very faint reaction. A further quantity of liquor arsenicalis, B.P., was, therefore, prepared and separate portions of it were contaminated with nitrate. The behaviour on storage is tabulated.

In the following notes on the tables the author states that as a result of the above investigation it has been shown that moulds are capable of growing in liquor arsenicalis. The extent of the growth is very limited in every case and in no instance was any development of garlic-like odour observed. There is, in addition, a tendency for crystals of arsenic trioxide to separate from this preparation. Data given indicate that the growth of moulds would be prevented if the PH of the solution were adjusted to 8.0 or higher, or to 2.0 or lower. The addition of preservatives in the quantities employed also was found to inhibit fungal growth, but with the exception of (i) spirit of lavender, 0.5 per cent. v/v and (ii) spirit of lavender and alcohol (as in liquor kalii arsenicosi, D.A.B. VI), which produced opalescent solutions, these preservatives could hardly be recommended. Compound tincture of lavender precipitated and formed a red deposit. Globules of oil separated and floated on the surface of the liquid when spirit of lavender, 3.0 per cent. v/v or 1.5 per cent. v/v was used. The appearance of the solution containing chloroform was satisfactory, but the volatility of this substance makes it unsuitable for a preparation which is used in small quantities and kept for long periods. It is noteworthy that moulds developed in a larger proportion of the B.P. specimens which were stored in filled, unopened containers than in those which were stored under dispensary conditions. This fact might reasonably imply that, for this preparation, dispensary conditions are not more favourable to the growth of moulds than laboratory conditions. Sodium hydroxide, instead of exerting an inhibitive action on the growth of moulds, appeared to have the reverse effect, since the proportion of specimens containing moulds increased considerably when potassium hydroxide was replaced by this substance. The effect of nitrates on the growth of moulds does not confirm the experience of Rae. As far as one can judge by the results, the growth of moulds is not affected by the presence of nitrates. Microscopical examination of the moulds, practically all of which were white in colour, showed them to consist of mycelia of septate hyphae. The mould from one specimen, when grown on nutrient gelatin produced large quantities of brown spores in various states of subdivision. In another case tufts of two or three one-celled branches, which appeared to be budding off conidia were observed. On inoculating nutrient gelatin with a specimen which had been prepared with the "musty" distilled water, and which contained skin-like growths, the presence of a penicillium, a yeast and a liquefying diplococcus was revealed. Specimens prepared with arsenic trioxide, B, appear to show the greatest tendency to develop fungal growths. Attempts were made to grow moulds on beerwort media direct from this specimen, but were unsuccessful. Minute heavy deposits were observed in a number of the specimens, particularly in those with PH values coming within the range of 5.0 to 7.6. Microscopical examination of these deposits showed the presence of the typical crystals of arsenic trioxide. In the solutions adjusted to PH 4.0, PH 8.0 and PH 9.0 no perceptible deposit could be detected for about the first two months of storage. Traces of crystalline deposit collected later, but were probably washed off the stoppers owing to the frequent opening and shaking of the bottles. It was judged from these facts that reasonably safe limits of PH for preventing the deposit of arsenic trioxide would be 4.0 and 9.0. The results of the above experiments lead, therefore, to the conclusion that it is not possible to prepare an entirely satisfactory neutral solution of arsenic. In order to ensure freedom from moulds and from the separation of arsenic trioxide crystals, it has been shown that the solution must be more acid than PH 2.0 or more alkaline than PH 9.0. An alkaline solution is undesirable on account of its incompatibility with solution of strychnine hydrochloride, and an acid solution is therefore to be preferred.

SUMMARY

The occurrence of moulds and deposits containing arsenic trioxide in some specimens of liquor arsenicalis B.P. 1932 is confirmed. No objectionable odours have been detected. The use of sodium hydroxide instead of potassium hydroxide was found to encourage rather than prevent the growth of moulds. No increase in the tendency to grow moulds was observed when liquor arsenicalis was contaminated with traces of nitrate. Storage under dispensary conditions was not found to be more favourable to the development of moulds than storage in closed, filled containers. The growth of moulds was found to be inhibited by the addition of preservatives and by the adjustment of the solution to PH 2.0 or to PH 8.0. The limits of PH beyond which the formation of arsenic trioxide crystals would be prevented were considered to be 3.0 and 9.0. On account of the incompatibility of an alkaline solution with solution of strychnine hydrochloride, an acid solution is to be preferred.

DISCUSSION

MR. DEANE suggested that experimenters had not received the bad specimens that have been made.

MR. RAE thought it possible that the solutions with which the authors had experimented would not grow mould, whether nitrates were there or not.

MR. BERRY expressed himself as not happy with solutions inoculated with moulds, and did not think the factors relating to their growth were understood.

MR. C. T. BENNETT said in his experience growth of mould varied considerably. He advocated the use of chloroform. Specimens of liquor arsenicalis which he had sent to the Pharmaceutical Society contained *penicillia*.

MR. POWELL had had similar experiences to that of the previous speaker. He had sterilised the solution in the bottles before dispatch, and suggested that the trouble may lie with the bottles rather than the ingredients. There may be symbiosis which enables nitrates to be used.

MR. WALMSLEY considered some preservative was required, and preferred lavender and colouring matter. A galenical so potent should not be without some means of identification.

MR. MONAGHAN referred to the soluble silicates in liquor potassæ. Silicic acid, he thought, promotes the growth of mould. Old solutions of liquor potassæ were particularly suspicious in this connection.

MR. CHAMINGS referred to a number of solutions which had been prepared by students using the same materials and under the same working conditions and storage. Four-fifths of the samples had been free from mould after six months.

MR. JORDAN thought chloroform was the most suitable preservative, but a colourless solution containing it might be mistaken for chloroform water. If a satisfactory solution could be prepared, would the present B.P. formula have to remain until the next edition of that work? He suggested going back to liq. arsenicalis and liq. arsenicalis hydrochlor. coloured with a suitable dye.

MR. MACKIE asked how a solution of PH3 was prepared.

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MR. WALLIS said there must be some form of carbon in the solution from which the substance of the mould was built up.

MISS SMELT, in reply, had had no specimens with grey or black deposit and they had been of limited growth. Chloroform was objectionable owing to its volatility. As to colouring, she thought it was to conform to international agreement. The PH_3 solution was made in the ordinary way, neutralised to litmus, and then hydrochloric acid added. Moulds in her experience had been limited in growth.

The next paper, presented by Mr. A. D. Powell, was:—

The Determination of Acriflavine and Related Medicinal Dyes

By A. D. POWELL and G. F. HALL

[ABSTRACT]

THE quality of the flavine dyes used in medicine is usually determined by an analysis involving estimations of nitrogen, and of either chloride or sulphate, together with tests for freedom from insoluble impurities and from excess of inorganic salts. The nitrogen percentage is not necessarily a true index of quality since nitrogenous impurities may be present either in manufacture or produced by subsequent decomposition. The flavine dyes, particularly when in solution or disseminated on medicated dressings, are liable to form brown tarry substances on exposure to light. The method proposed depends upon the insolubility of the ferricyanides of the flavine dyes, that adopted for acriflavine and euflavine being as follows:—

Dissolve 2 gm. in 50 mils. of water, and add 50 mils. of M/10 potassium ferricyanide. Set aside for ten minutes and filter through a Buchner funnel. Wash with 50, 50, 50 mils. of water. Dilute the combined filtrate and washings with water to 500 mils. Add 10 mils. of hydrochloric acid 1.16, 10 gm. of sodium chloride, 1 gm. of potassium iodide, dissolve, and add a solution of 3 gm. of zinc sulphate in 10 mils. of water. Set aside for three minutes, and titrate the liberated iodine with N/10 sodium thiosulphate. When the titration is nearly completed, set aside for a further three minutes before completing the titration. The results recorded in Table I give a comparison of percentages by the above method and by calculation from total nitrogen:—

TABLE I

Acriflavine	Percentage from N.	Percentage by Ferricyanide	Euflavine	Percentage from N.	Percentage by Ferricyanide
1	95·7	97·0	1	91·1	89·7
2	96·5	96·2	2	87·5	87·1
3	95·6	96·1	3	90·8	90·8
4	94·1	96·5	4	90·5	89·3
5	93·8	98·8	5	88·1	89·6
6	97·9	99·0	6	91·8	89·1
7	97·7	98·2	7	89·5	90·1
8	97·5	98·0	8	91·6	91·2
9	96·6	97·3	9	91·0	91·5

When the above method was applied to proflavine, the lower solubility (1-200) required the addition of acid in order to give a clear solution prior to precipitation, or, alternatively, an increase in the volume of the solution. Precipitation from an acid solution was found to yield high results, as high as 120 per cent. under certain conditions, and similar results were liable to be given if precipitation was made from too concentrated solutions. As acriflavine ferricyanide is rather more soluble than proflavine ferricyanide, a series of tests was made to show the effect of the greater dilution on acriflavine determinations. The results indicated that at a dilution of 2 gm. in 750 mils. no appreciable effect due to solubility is produced. Another series of experiments showed that it is important to control the reaction both on the acid and alkaline side. The addition of a buffer solution after the preliminary solution has been adjusted to Congo-red paper is therefore an advantage. The method recommended for general use with acriflavine and proflavine is as follows:—

Dissolve 2 gm. in 250 mils. of water (which may be hot if necessary). Dilute with water to 750 mils. Adjust the reaction at room temperature by the addition of N/1 hydrochloric acid until faintly acid to Congo-red paper, and subsequently add 5 gm. of sodium acetate. Add 50 mils. of M/10 potassium ferricyanide, stirring during the addition. Set aside for ten minutes, filter through a Buchner funnel, wash the precipitate with 50, 50, 50 mils. of water. Add to the combined filtrate and washings, 10 mils. of hydrochloric acid 1.16, 10 gm. of sodium chloride, 1 gm. of potassium iodide, and 3 gm. of zinc sulphate, dissolved in 10 mils. of water, mixing after each addition. Set aside for three minutes and complete as above. The percentage of acriflavine formed by the above method was 95.7 per cent., compared with 96.6 by nitrogen estimation, the corresponding figures for proflavine being 95.1 per cent. and 96.6 per cent. respectively.

DISCUSSION

THE CHAIRMAN, in inviting discussion, remarked that this was a very important subject. There was no method of assay in the British Pharmacopœia.

MR. AITKIN called attention to an apparent anomaly in the authors' treatment of the nitrogen percentage.

DR. EWING inquired why the percentage was always lower for euflavine than for acriflavine or proflavine.

MR. POWELL, in reply, said that the apparent discrepancy with the nitrogen factor arose from the fact that at first the authors were using an ordinary brine: afterwards they used sodium chloride. An allowance was made for moisture in euflavine.

THE CHAIRMAN briefly introduced the next paper (sent from Canada), remarking that the authors seemed to differ from the opinion in this country.

The Relative Activity of Ergotoxine and Ergotamine with Special Reference to the Assay of Ergot Preparations

By E. LOZINSKI, G. W. HOLDEN and G. R. DIVER

[ABSTRACT]

IN a previous communication the authors presented data which indicated that while ergotoxine and ergotamine gave aproximately equivalent values when assayed by the chemical method of Smith, by the biological method (Broom and Clark), ergotamine appeared to possess but 60 per cent. of the activity of ergotoxine. If the difference in biological activity of ergotoxine and ergotamine is significant, and we believe it is, then a very considerable difference in biological activity of ergot preparations will occur, depending on whether ergotoxine or ergotamine is used as a standard of reference in the biological assay. Only on the basis of a difference between the activity of the two alkaloids is it possible to reconcile the approximate agreement between the chemical assay and the bio-assay of ergot preparations when ergotamine is used as a standard.

Thus Smith and Timmis have shown that only ergotoxine and ergotinine can be extracted from official ergot. Since both these alkaloids give colour reactions which are quantitatively and qualitatively identical, it follows necessarily that in the assay by the colorimetric method the intensity of the colour will be due to the sum of the effects of the ergotoxine and ergotinine. When assayed biologically, using ergotoxine as a standard of reference, only the active ergotoxine is measured so that the difference between the chemical assay and the bio-assay of an ergot preparation should be a measure of the ergotinine present in that preparation. On this basis the authors and Wokes and Crocker criticised the chemical method of assay, and in our experiments reported in 1931 we suggested that the approximate agreement of the chemical assay and biological assay noted when ergotamine is used as a standard, as is usually done in the U.S.A., could be explained by the fact that ergotamine

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possessed but 60 per cent. of the bio-activity of ergotoxine. The suggestion by Swoap, Cartland and Hart and Stevens that by the methods of extraction used no ergotinine is extracted is not tenable. Our own work on the extraction of ergotoxine has shown that ergot extracts contain very considerable amounts of ergotinine.

Indirect confirmation of our findings is contained in the report of the Subcommittee on Ergot. For the purpose of obtaining more direct evidence, the following experiments, the results of which are tabulated below, were performed. Fluid extracts of ergot were assayed colorimetrically aud biologically, using ergotoxine ethanesulphonate and ergotamine tartrate as standards. The colorimetric method used was Allport and Cocking's modification of Smith's technique. This modification has proved very satisfactory. The bio-assays were performed with the Broom and Clark technique. The standards used in this work, ergotoxine ethanesulphonate and ergotamine tartrate, have been previously described. Their colour reactions and biological activity, relative to each other, are given in Table I. From Table I it is apparent that ergotoxine and ergotamine are equivalent approximately by colour test, and by bio-assay ergotamine has but 60 per cent. of the activity of ergotoxine. In Table II this relationship is confirmed, since fluid extracts of ergot, when tested colorimetrically against ergotoxine and ergotamine give approximately equivalent results, but by biological test show differences in activity accountable to the difference between the biological activity of the two alkaloids, ergotoxine and ergotamine. Confirmation is here obtained of the fact that ergotoxine constitutes approximately 60 per cent. of the alkaloids of ergot. The conclusions to be drawn are:—(1) That in the colorimetric assay of ergot a correction for the presence of ergotinine should be introduced; (2) when assayed biologically, using ergotamine as a standard, a correction for the lower activity of this salt, as compared with ergotoxine, should be introduced. In both instances, for all practical purposes, 60 per cent. of the observed readings would give a sufficiently close approximation of the ergotoxine content.

Summary

The relation between the chemical and biological values of ergotoxine and ergotamine is discussed. The necessity for correcting for relatively inert ergotinine, when extracts of ergot are assayed colorimetrically, is emphasised. It has been pointed out that since official ergot contains only ergotoxine and ergotinine, a correction for the lower activity of ergotamine must be made, when the latter is used as a standard in the biological evaluation of ergot preparations. The correction suggested, on the basis of experimental data, is 60 per cent. of the observed readings in each instance.

There was no discussion. The paper was followed by one on a related subject:—

Table I

	Bio-assay	Colour assay
Ergotoxine	100 per cent.	100 per cent.
Ergotamine	60 per cent.	107 per cent.
Ergotoxine	100 per cent.	100 per cent.
Ergotamine	65 per cent.	109 per cent.

Table II

All values expressed as base (85 per cent. of the salts)

	Ergotoxine standard			Ergotamine standard			
	Bio-assay per cent.	Colour assay per cent.	Physiologically active base ergotoxine, per cent. of total bases	Bio-assay per cent.	Colour assay per cent.	Physiologically active base, per cent. as ergotamine	Percentage of colour value due to ergotoxine
Extract A	0·028	0·048	58·3	0·049	0·043	114	65·0
Extract B	0·06	0·103	58·2	0·108	0·096	112	62·5

From the laboratories of C. E. Frost & Co., Montreal, Canada.

There was no discussion. The paper was followed by one on a related subject:—

The Keeping Properties of Liquid Extract of Ergot

By E. M. Smelt, B.Pharm., Ph.C.

[Abstract]

From the results of previous investigations it is inferred that oxidation is probably the most important factor in causing loss of activity in liquid ergot preparations, but such information is valuable only in respect of the particular preparation. The present work concerns the changes which may take place during storage of liquid extract of ergot prepared by the process of the British Pharmacopœia of 1932. The B.P. assay for alkaloidal strength provides satisfactory results, but suffers from the disadvantage that colour development is slow in the absence of sufficient light. Duplicate assays were made in all cases using Allport and Cocking's modification thereof whereby colour is developed without exposure to light. In the modified assay a trace of ferric chloride is added to dimethylaminobenzaldehyde reagent made to 65 per cent. strength of sulphuric acid (instead of the official 50 per cent). The results are given by both processes except when the light did not enable the B.P. assay to be completed in the specified time. The claim of Allport and Cocking that maximum colour develops within one minute was found not to hold in every case, and it was decided to allow the mixture to stand for fifteen minutes before making comparison with the standard solution of ergotoxine ethanesulphonate. It was found that the modified process, for practical purposes, gave the same results as the B.P. process. Difficulty was experienced owing to emulsification during the first extraction with ether. The formation of emulsions was, however, avoided by carrying out the extraction as follows:—

Five millilitres of the liquid extract was diluted with 25 millilitres of distilled water, rendered slightly alkaline with about 0.7 millilitre of dilute solution of ammonia, and extracted with successive portions of 40, 35, 30 and 30 millilitres of ether. It was found advisable not to shake too vigorously during the first extraction with ether, but after this the mixtures could be shaken vigorously. The ether solution was washed as directed in the B.P. and then extracted five times with successive portions of 4 millilitres (or, for strong liquid extracts, 5 millilitres) of 1-per-cent. w/v solution of tartaric acid. After removal of the dissolved ether, the acid solution was made up to 20 millilitres (or, for strong liquid extracts, 25 millilitres).

A Klett colorimeter was used for the colour comparisons, but dilution with water and comparison in Nessler glasses was found to give comparable results. For the purpose of this investigation four specimens of liquid extract of ergot, B.P., were used. Three, A, B and D, were obtained from manufacturers and one, C, was prepared in the laboratory. Each specimeu (except D) was divided into three portions and kept in:—

(1) A partly filled, white glass corked bottle at room temperature (14° to 25° C.) in the light.

(2) A completely filled, corked bottle at room temperature in the dark.

(3) A completely filled, corked bottle in an ice-chest (3° to 4° C.).

There was only a small quantity of specimen D and this was kept in a partly filled, blue glass, corked bottle in the light. The liquid extracts were assayed when received (A, B and D) or when freshly prepared (C) and their strengths were determined at intervals during the

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period of storage. The results are summarised in the following tables:—

Strengths when received or when freshly prepared :—

Specimen	Per cent. w/v of alkaloids B.P. method	Per cent. w/v of alkaloids modified method
A	0·053	0·056
B	0·05	0·046
C	0·058	0·058
D	0·052	0·047

After storage at room temperature in partly filled bottles in the light :—

Specimen	Period of storage	Per cent. w/v of alkaloids B.P. method	Decrease in strength B.P. method	Per cent. w/v of alkaloids modified method	Decrease in strength modified method
			Per cent.		Per cent.
A ...	18 days	0·055	3·8 increase	0·052	7·1
A ...	11 weeks	Light too dull to give reliable results	—	0·049	12·5
A ...	18 weeks	0·044	17·0	0·041	26·8
B ...	23 days	Light too dull	—	0·041	10·9
B ...	8 weeks	Light too dull	—	0·038	17·4
B ...	12 weeks	Light too dull	—	0·026	43·5
C ...	4⅜ weeks	Light too dull	—	0·044	24·1
C ...	13 weeks	0·027 approx.	53·4 approx.	0·030	48·3
D ...	2 weeks	Light too dull	—	0·043	8·5
D ...	9 weeks	Light too dull	—	0·029	38·3

After storage at room temperature in filled bottles in the dark :—

A	...	11 weeks	Light too dull	—	0·047	16·1
A	...	18 weeks	0·042	20·8	0·041	26·6
B	...	12 weeks	Light too dull	—	0·043	6·5
B	...	18 weeks	0·036	28·0	0·038	17·4
C	...	5 weeks	Light too dull	—	0·045	22·4
C	...	12 weeks	0·037	36·2	0·038	34·5

After storage in filled bottles in an ice-chest :—

A	...	11 weeks	0·055	†	0·056	0·0
A	...	20 weeks	0·055	†	0·056	0·0
B	...	12 weeks	0·045	10·0	0·047	†
B	...	20 weeks	0·045	10·0	0·045	2·2
C	...	5 weeks	0·056	3·4	0·056	3·4
C	...	13 weeks	0·054	6·9	0·057	1·7

† Apparent increase.

The above tables show that liquid extract of ergot, B.P., deteriorates at room temperature, but that its stability at this temperature is variable. The rate of deterioration varies from sample to sample, but it may be concluded from the figures obtained that it is inadvisable to keep liquid extract of ergot, of maximum B.P. strength, for more than six weeks under ordinary dispensary conditions. The British Pharmacopœia states that liquid extract of ergot should be kept in a completely filled container, and stored in as cool a place as possible. These results support the additional recommendations made by other workers, that the containers should be protected from light, and that they should be of a size to contain only the quantity which is likely to be used for one prescription (say 1 fl. oz.). Specimen A, for example, when stored at room temperature in filled bottles in the dark lost 26.8 per cent. in 18 weeks and when kept in the ice-chest it showed no appreciable deterioration in 20 weeks. A marked delay in the deterioration of the liquid extract is produced by storage in an ice-chest. The deterioration over a period of thirteen to twenty weeks was practically negligible in every case. At present, storage in an ice-chest appears to be the only reliable method of ensuring the stability of this preparation for any prolonged period.

Summary

The B.P. method of assay for liquid extract of ergot requires bright sunlight or a mercury vapour lamp and cannot be always used. Allport and Cocking's modification of this assay is found to give identical results and may be conveniently carried out at any time.

The rate of deterioration of liquid extract of ergot, B.P., 1932, under different conditions of storage has been investigated.

At room temperature in partially filled bottles rapid loss of alkaloid takes place.

If the liquid extract is kept for more than six weeks under ordinary dispensary conditions, the alkaloidal strength is liable to fall below the minimum permitted by the B.P.

When kept at room temperature in filled bottles in the dark, the keeping properties are much improved.

The rate of change in liquid extracts kept in completely filled bottles in an ice-chest is very slow.

The author expresses appreciation and thanks to Dr. C. H. Hampshire for numerous suggestions and advice.

Discussion

Mr. Evers remarked that temperature was a more important factor than oxidation.

Mr. Broom inquired if there was an alternative to the mercury lamp—e.g., magnesium ribbon.

Professor Burn congratulated the author, whose results confirmed the rough indications of a biological method. He inquired what was meant by an ice-chest temperature. Was the addition of hydroquinone to retard deterioration practicable?

Mr. Allport pointed out that one minute was not sufficient for the development of colour: he made it a practice to allow five minutes.

Dr. Linnell said that he had examined commercial specimens differing widely. Hydroquinone could only promote stability if degradation was due to an oxidation. Deterioration was emphasised in dilute solutions, but not so profoundly as might have been expected—perhaps 30 per cent. in twenty-one days. Powdered ergot was stable, as also were the alkaloids when not in presence of a solvent. Research was wanted regarding the state of combination existing in the drug itself.

Mr. Treves Brown inquired what had become of the suggestion to have the air in bottles containing the liquid extract replaced by an inert gas.

Mr. Bull remarked that the suggestion was an American one, but the data on it were not definite.

Miss Smelt, replying, said that magnesium ribbon would probably give too rapid a flash compared with a mercury lamp. The ice-chest temperature was from about 3° C. to about 4° C.

The next paper, which was read by Mr. Walmsley, was on:—

The Determination of Moisture in Mercuric Oxide

By G. J. W. Ferrey, B.Sc., A.I.C.

The B.P., 1932, directs that yellow mercuric oxide shall be dried at 150° C. for one hour, the original oxide assayed and the result calculated on the basis of the dried oxide. The U.S.P. X. directs that the oxide shall be dried "to constant weight" at 150° C., and the dried product assayed. The B.P. method is much to be preferred, as it is obvious from the simplest experiments that marked amounts of mercurous oxide may be produced by exposure to high temperatures. It has been the practice in this laboratory to use a temperature of 100° C. for the determination of moisture in mercuric oxide, with quite satisfactory results. The composition of the product obtained by precipitating soluble mercury salts from aqueous solution by means of alkalis, and the behaviour of the products under the influence of heat, have been the subject of many researches.

In order to determine the magnitude of the loss in weight through decomposition at different temperatures, use was made of a sample of mercuric oxide of reagent quality sold as suitable for standardisation purposes. This assayed 99.96 per cent. by thiocyanate, lost no weight on continued exposure over sulphuric acid in a

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vacuum desiccator, and gave no reaction for mercurous oxide. It was therefore assumed to be anhydrous. The losses in weight on heating were found by exposing 1 to 1.5 gm. of the pure oxide in a fairly even layer in a flat dish 5 cm. in diameter. It was found essential to pay particular attention to keeping the temperature constant, as the rate of loss through decomposition varied considerably with slight changes in temperature. This undoubtedly accounts for the rather variable results obtained at 150° C., since an air oven was used and exact temperature control proved very difficult. In order to gain some idea of the variation to be expected with small variations in temperature, two experiments were carried out at a temperature of 170° C., when it was found that the rate of decomposition was about four times greater than at 150° C. The losses at 150° C. are:—

Experiment	Loss in weight per cent.			Average loss in weight per hour per cent.
	1st hour	2nd hour	3rd hour	
1	0·21	0·28	0·18	0·22
2	0·36	0·32	0·31	0·33
3	0·24	0·32	0·27	0·28

At 100° C., the losses in weight per hour were very small, ranging from 0.01 to 0.04 per cent., with an average of 0.032 per cent. The loss in weight through decomposition at 150° C. is therefore considerable, and may exceed the actual moisture content of the sample. At 100° C., the loss through decomposition is negligible.

In attempting to prepare pure moist oxides, difficulty was experienced in obtaining products containing notable amounts of water.

Decomposition of Mercurous Oxide

The amount of mercurous oxide in the B.P. yellow oxide is limited only by a qualitative test, which requires not more than a faint turbidity on dissolving 0.5 gm. of the oxide in 25 mils of dilute hydrochloric acide. Reference to our laboratory records shows that only rarely does the mercurous oxide content of yellow mercuric oxide exceed 0.3 per cent., most samples falling between 0.1 and 0.2 per cent. A sample of mercurous oxide containing 78 per cent. of actual Hg_2O, on heating at 100° C. lost 0.97 per cent. in weight in the first hour, 0.76 per cent. in the second, and 0.73 per cent. in the third. The loss in weight through decomposition is thus not very considerable, considering the nature of the substance. On diluting this sample with pure anhydrous mercuric oxide, however, the rate of decomposition of the mercurous oxide increased, as might be expected. A carefully prepared mixture containing 2.5 per cent. of the above mercurous oxide lost 0.34 per cent. in one hour at 100° C. Another mixture was prepared containing 0.35 per cent. of mercurous oxide, and this lost 0.10 per cent. in one experiment, and 0.06 per cent. per hour in another. At 100° C. therefore there is a small loss in weight owing to the decomposition of mercurous oxide occurring as impurity. Further experiment showed that this effect could be minimised by drying at a temperature of 70° C.

Influence of Non-Volatile Matter

The B.P. allows the presence of 0.5 per cent. of non-volatile matter in yellow mercuric oxide. The usual precipitants are sodium or potassium hydroxides, and therefore sodium or potassium carbonate may occur in yellow mercuric oxide in addition to sodium and potassium chlorides. Usually sodium hydroxide is employed, potassium only rarely. Traces of ferric and aluminium hydroxides and siliceous impurities also occur, no doubt as impurities from the alkali, but are normally present in so small an amount that the water they would hold at 70° C. would be quite negligible. The chief impurity in several samples examined in this laboratory was calcium carbonate, but magnesium carbonate was not detected, although its presence in the non-volatile matter of yellow mercuric oxide has been recorded. Such impurities are derived from the water used in washing the oxides. Several samples were examined for water-soluble calcium and magnesium salts with negative results. Calcium is therefore probably present in yellow mercuric oxide as the carbonate. Since, in actual fact, the water-soluble alkali in the residue on ignition constitutes only a fraction of the non-volatile impurity, the error involved is usually considerably less. In two samples examined as to the constitution of the residue on ignition, the water-insoluble portion consisted of calcium carbonate with negligible traces of iron oxide and siliceous matter, and the water-soluble portion, amounting to about one-third of the total ash in each case, was sodium carbonate with a minute amount of sodium chloride. In these two cases, the error involved in a moisture determination at 70° C. would be less than 0.03 per cent., calculated as a percentage on the original mercuric oxide.

Summary

(1) Moisture in B.P. yellow mercuric oxide may be determined with negligible error by drying for one hour at 70° C.

(2) The error involved in drying at 150° C. is considerable.

(3) The behaviour of mercurous oxide on heating has been investigated.

(4) The influence of the non-volatile impurities in yellow mercuric oxide on the determination of moisture is discussed.

(From the analytical laboratory of James Woolley, Sons & Co., Ltd.)

Discussion

Mr. Bird said he had never understood why 150° had been selected. The difficulty of maintaining that temperature would not arise, of course, with an electric oven. He suggested that 100° would be better, as a water or steam oven would then require no attention. Had the author used commercially prepared oxides? Iron was a frequent impurity and difficult to remove.

Dr. Ewing said he was not sure that this paper marked finality. A large number of these products fell short of 100 per cent. It was difficult to account for the discrepancies probably due to hydration.

Mr. A. J. Jones asked for the author's process for estimating the -ous salt.

Mr. Walmsley said in the absence of the author he could not answer that question. Chloride does upset the titration, so that the 99.9 per cent. cannot be obtained. A number of commercial salts have been examined.

The next paper, also presented by Mr. Walmsley, was:—

Note on the B.P. Limit Test for More Soluble Sugars in Lactose

By G. J. W. Ferrey, B.Sc., A.I.C.

In examining samples of lactose, it was found that specimens passing the B.P. tests in other respects and possessing no odour often gave residues in the limit test for more soluble sugars rather over the B.P. limit of 0,005 gm. Further investigation suggested that the B.P. limit is too low for lactose produced on a commercial scale, which appears normally to contain a minute amount of alcohol-soluble matter other than lactose. As samples showing this property are satisfactory in every other respect, and the excess of residue in the limit test bears no relationship to either the acidity, odour, solubility, ash or specific rotation of the samples, as is apparent from the tabulated results of investigation of samples from various sources, it is suggested that the B.P. limit might well be trebled without detracting in any way from the usefulness of the test in detecting adulteration by cane sugar or dextrose. At the same

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time, the test might be made more definite by following the U.S.P. plan of taking a definite amount of the alcoholic extract for evaporation, instead of the total filtrate which varies in volume with difference in method of filtration. The author employs simple filtration through a 9 cm. Whatman No. 40 filter-paper, giving 17 mils of filtrate; this quantity of filtrate is always evaporated and the result returned as the amount of residue found in the B.P. test. For the purposes of this note, the amount of residue so obtained has also been calculated on the basis of the full amount of alcoholic solution, i.e., 20 mils. The extractions were carried out at a temperature of 15.5° C.

During the course of this investigation, the solubility of pure lactose in 90-per-cent. alcohol was determined, as this figure could not be found in the literature. In one experiment, pure lactose was washed with three lots of warm 90-per-cent. alcohol to remove alcohol-soluble impurities which might be present, and then shaken with 90-per-cent. alcohol at 30° C., the mixture being cooled to 15.5° C. and kept at that temperature, with agitation at intervals, for several hours; 20 mils of the solution on evaporation and drying at 100° C. for fifteen minutes gave a residue weighing 0.0042 gm., which fell to 0.0041 gm., after a further thirty minutes at 100° C. In a second experiment, in which the washed lactose was simply shaken with 90-per-cent. alcohol at 15.5° C. for several hours, 20 mils of the solution, on evaporation and drying for fifteen minutes at 100° C., gave a residue weighing 0.004 gm. It was also found that the amount of lactose dissolved in ten minutes shaking with 90-per-cent. alcohol under the conditions of the B.P. test was 0.0033 gm. in 20 mils in one test, and 0.0037 gm. in 20 mils in another. (The author gives a table.)

It is suggested that the limit test for soluble sugars be given in the B.P. in the following form:—Shake 5 gm. with 20 mils of alcohol (90 per cent.) for ten minutes at 15.5° C., and filter; 10 mils of the filtrate, evaporated to dryness, leaves not more than 0.007 gm. of residue.

(From the analytical laboratory of James Woolley, Sons & Co., Ltd.)

Discussion

The Chairman remarked that this was another case of a B.P. monograph coming under the fire of criticism.

Mr. Powell agreed that a definite volume of filtrate was an advantage, but did not agree with the author's 0.007 gm. of residue as the suggested limit. It was rarely that so high a limit was needed, he thought.

Mr. Walmsley, replying, promised to convey Mr. Powell's remarks to the author.

The next paper, read by the author, was on:—

The Variation in the Susceptibility of Mice to Certain Anæsthetics

By J. C. Gage

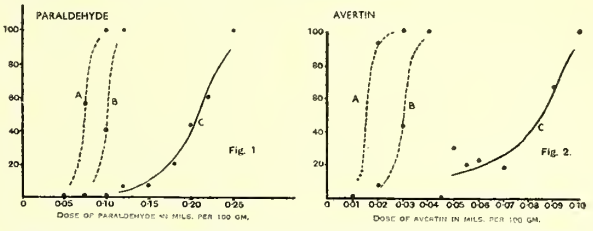
[Abstract]

Basal narcosis has become more popular in recent years, the drug being given intravenously, by mouth, or by rectum, while the patient is still in bed. This rapidly produces a deep sleep; the patient then requires only a little ether and oxygen to produce full surgical anæsthesia. From anæsthesia the patient passes into a long natural sleep, and on awakening amnesia is complete from the time of administration of the injection. Recently certain of these basal narcotics, notably tribromethyl alcohol (avertin), have been used as true anæsthetics, without subsequent use of a volatile anæsthetic. The barbiturates, while having considerable use as basal narcotics, have not been used in this manner. The difficulty of estimating the correct dosage has constituted the chief reason why basal narcosis has not been generally adopted, patients showing a considerable variation in their susceptibility. This variation in susceptibility of mice is demonstrated below by investigation of the relation between the percentage of mice anæsthetised and the dose of anæsthetic administered, and at the same time the relation of the dose causing anæsthesia to the dose resulting in death has been determined.

Anæsthetics Used

(1) *Paraldehyde.* Rowbotham was the first to use this drug extensively as a basal anæsthetic by rectal injection; the dose suggested is one drachm per stone body weight, injected in aqueous solution.

(2) *Nembutal* is sodium ethyl-*l*-methylbutylbarbiturate; a white crystalline solid, easily soluble in water. It can be given by mouth or by intravenous injection, the latter method is to be preferred as the former method gives much greater variation. The maximum dose suggested for an adult is six grains.



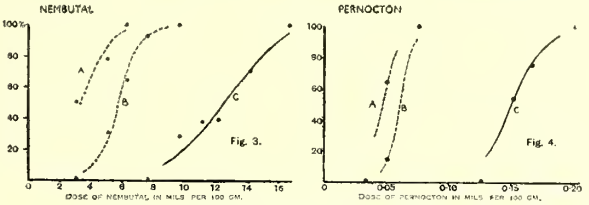
Figs. 1 and 2.—Relative narcotic and toxic effects of the basal narcotics paraldehyde and avertin. Curve A indicates short narcosis (more than one minute), Curve B indicates long narcosis (more than one hour) and Curve C indicates mortality. Ordinates represent percentages of animals affected, abscissæ represent rectal doses in mils per 100 gm. body weight.

(3) *Pernocton* consists of a 10 per cent. aqueous solution of the sodium salt of secondary butyl β-bromallylbarbituric acid, and is supplied in sterile ampoules containing 2.2 mils. The maximum dose suggested is 1 mil per 12.5 kgm. body weight, by intravenous injection.

(4) *Avertin* is tribromethyl alcohol, a white crystalline solid slowly soluble in water. In order to facilitate solution in water it is supplied as a solution in amylene hydrate; 1 mil of this solution, known as avertin liquid, contains 1 gm. of avertin. The dose required to produce basal narcosis is 0.1 mil per kgm. body weight administered by rectum in a 2.5 or 3 per cent. solution. In order to prepare a solution for injection a measured quantity of the avertin liquid is added to the requisite amount of distilled water at 37° C., and the mixture shaken until oily droplets are no longer visible. If the solution is heated above 40° C. the avertin decomposes into dibromacetaldehyde and hydrobromic acid; to make sure that this decomposition has not taken place a portion of the solution should be tested with congo-red immediately before use.

Results

In all the experiments the doses given were proportional to the body weight of the mice. Since nembutal and pernocton are administered clinically by intravenous injection this procedure was followed in the injection of



Figs. 3 and 4.—Relative narcotic and toxic effects of the basal narcotics nembutal and pernocton. Curve A indicates short narcosis (more than one minute), Curve B indicates long narcosis (more than one hour), and Curve C indicates mortality. Ordinates represent percentages of animals affected, abscissæ represent intravenous doses per 100 gm. body weight.

the mice; for the same reason paraldehyde and avertin were given by rectum. A mouse was considered to be narcotised when it was unable to turn over within one minute after being placed on its back. With low doses

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of anæsthetic no mice were narcotised ; but as the dose was increased a certain percentage were narcotised, and with larger doses some mice were narcotised more than one hour. When the doses were such that some of the mice failed to recover from the anæsthetic the duration of narcosis of those mice which did recover varied considerably. In the majority, this period was from three to five hours, in two of the mice is was as much as fifteen hours.

TABLE I

Anæsthetic	50 per cent. narcotic dose : Dose more than one hour	50 per cent. Toxic Dose	Ratio Narcotic Dose : Toxic Dose
Paraldehyde	0·102 mil.	0·208 mil.	0·49
Nembutal ...	5·7 mg.	12·2 mg.	0·48
Pernocton ...	0·06 mil.	0·149 mil.	0·40
Avertin ...	0·031 mil.	0·081 mil.	0·38

For each anæsthetic three curves have been constructed ; the first demonstrates the percentage of mice which were narcotised for more than the minimum period of one minute, the second demonstrates the percentage narcotised for more than one hour, and the third relates the dose to the percentage of mice killed on that dose (see Figs. 1 to 4.). For each of the four anæsthetics it will be seen that the curves have approximately the same shape and relative positions. The curves for short and long narcosis are the usual sigmoid curves which characterise the normal variation of response of animals to a series of doses of a drug with physiological activity. The curves which show the percentage mortalities are much less steep, and show a flattening at the lower end ; this indicates that the variation in susceptibility to toxic doses is greater than to anæsthetic doses, also that there is a small proportion of animals which are abnormally susceptible to the toxic action of the drug. The similarity between the action of the four anæsthetics may be seen by comparing the ratio between the dose causing narcosis for more than one hour in 50 per cent. of the animals, and the dose which results in death in 50 per cent. These two doses are found by interpolation on the respective curves, the ratio being given in Table I. The results of the investigation, particularly the narcotic-toxic ratios shown in Table I, indicate that there is little difference in the response of mice to the anæsthetic or of the toxic action of any of the four anæsthetics. The margin of safety of paraldehyde is certainly not greater than that of the other anæsthetics. While the shapes of the curves have indicated that a small proportion of animals show an abnormal susceptibility to the toxic action of the anæsthetics, yet with every anæsthetic a dose can be given which will narcotise almost every mouse for more than one hour without killing any.

Discussion

Professor Burn referred to the variation in toxicity in animals and in man.

Mr. Broom pointed out that the ratio of the toxic dose to the anæsthetic is relatively small.

Mr. Powell asked as to the purity of the paraldehyde, since that might account for a certain amount of idiosyncrasy.

Mr. Gage said the paraldehyde was of A.R. quality.

The next paper, presented by Professor J. H. Burn, was :—

Estimation on Parathyroid Hormone

By F. J. Dyer, B.Sc., F.I.C., Ph.C.

[Abstract]

During 1932 a note was published describing experiments in which parathyroid extract injected into male rats produced a rise in the amount of calcium excreted in the urine, which lasted from one to four days. After the note was published several experiments were performed in which no rise in urinary calcium was obtained and the failure remained unexplained, although a series of further experiments was done. In November 1932, a valuable paper was published by Pugsley which confirmed the observation that parathormone produces a rise in the output of urinary calcium of rats. Pugsley found, however, that a series of daily injections rather than a single injection was necessary. Whereas the author had previously determined the calcium in the urine directly, Pugsley first incinerated the urine and determined the calcium in the ash. The author has, therefore, made further experiments with the modifications indicated in the summary. The results are given in the following tables :—

I.—Output of Urinary Calcium in Two Groups of Rats before and after giving Subcutaneous Injections of Parathyroid Extract

	Day of expt.	No. of male rats used	Total body weight (gm.)	Volume of urine excreted in 48 hours (c.c.)	Total urinary calcium output for 5 rats in 48 hours (mgm. Ca)	Average output in 48 hours of urinary calcium (mgm. Ca)
Group I	2	5	1050	32	2·38	2·5
	4			34	1·78	
	6			48	3·34	
	8			38	10·6	9·3
	10			12	13·5	
	12			10	3·8	
Group II	2	5	800	23	4·6	3·9
	4			30	4·3	
	6			50	2·7	
	8			28	6·8	5·7
	10			15	8·3	
	12			—	1·9	

The rats in the above groups were injected with parathormone on the sixth, seventh and eighth days, those in Group I each receiving 0·5 c.c. per 100 gm., and those in Group II 0·25 c.c. per 100 gm. of body weight each day.

II.—Output of Urinary Calcium in Two Groups of Rats before and after giving Subcutaneous Injections of Parathyroid Extract

	Day of expt.	No. of male rats used	Total body weight (gm.)	Volume of urine excreted in 48 hours (c.c.)	Total urinary calcium output in 48 hours (mgm. Ca)	Average output of urinary calcium (mgm. Ca)
Group III	2	5	1250	82	4·7	3·8
	4			60	2·9	
	6			78	69·3	40·4
	8			115	11·4	
Group IV	2	5	1220	75	4·7	4·7
	4			62	4·7	
	6			86	30·5	18·5
	8			58	6·6	

The rats in the above groups were each injected with parathormone on the fourth, fifth and sixth days, those of Group III being given 0·24 mil and those of Group IV 0·12 mil of parathormone each day per 100 gm. of body weight.

Summary

Experiments are described using groups each of five male rats weighing 140 to 180 gm., for measuring the increase produced in the urinary calcium by two different doses of parathyroid extract.

The method suggested by the author in an earlier note has been amended. (1) Each rat is placed in a cage by itself, but the urine from a group of five is pooled ; (2) the diet is given as a paste containing about 15 per cent. of butter ; (3) the urine is collected at the end of forty-eight hours and not at twenty-four hours as previously ; (4) the urine is incinerated and the calcium determined in the ash, by the method of Clark and Collip ; (5) injections of parathyroid extract are given for three successive days.

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To carry out an estimation, two groups of rats must be used simultaneously, one being used for the extract to be tested and the other for the standard of reference. Owing to the great variation of rats in their response to parathyroid hormone, and the limited number of experiments done, it has not so far been possible to construct a curve relating dose and effect. The test sample must, therefore, be matched against the standard, so that it produces the same rise in urinary calcium as the standard.

From the pharmacological laboratory of the Pharmaceutical Society of Great Britain.

Discussion

Mr. Bird expressed his appreciation of the way in which Professor Burn had summarised the paper.

Mr. Broom congratulated the author. Mr. Broom had tried rabbits, which required an enormous dose to get any reaction at all.

Mr. Boyes asked if there were any data regarding the stability of parathyroid extract. He also asked if in Collip's method of assay dogs were used from which the parathyroid glands had been removed.

Professor Burn, replying, said rats could not be used twice over. He had no information as to the stability of the extract. Collip uses normal dogs.

The next paper was:—

A New Method for the Determination of Elemental Sulphur

By Noel L. Allport

[Abstract]

The method for determining elemental sulphur most commonly used involves oxidation to sulphuric acid followed by precipitation with barium chloride. This operation is tedious, and difficult to apply to many pharmaceutical preparations. A further complication arises when the material contains sulphates in addition to free sulphur. A search of chemical literature showed that although very little work has been done involving the use of new principles for the analysis of free sulphur, two alternatives to oxidation likely to be of use for the assay of pharmaceutical preparations have been described by Upton and Castiglioni respectively.

A technical grade of triethanolamine, or trihydroxytriethylamine, is readily obtainable, and is the material which has been employed for the author's work. It is a viscous hygroscopic liquid consisting of trihydroxytriethylamine mixed with approximately 7 per cent. of monohydroxy-monoethylamine and 18 per cent. of dihydroxy-diethylamine. An aqueous solution of potassium cyanide and triethanolamine keeps well, and it is therefore convenient to make a stock solution, and to determine in terms of $N/10$ silver nitrate the value of its "blank" due to the almost invariable presence of chlorides in the potassium cyanide and thiethanolamine. A reagent made in accordance with the following formula has been found to be generally applicable:—Potassium cyanide A.R., 40 gm.; triethanolamine, 90 c.c.; water, to produce 1000 c.c. When the reagent is appreciably weaker, absorption of sulphur is slower, but a more concentrated solution does not offer any advantage. It is recommended that 50 c.c. of the reagent should be used for each assay, and this is sufficient for the conversion of about 0.1 gm. of sulphur into thiocyanate.

The method was first tested with the sulphur ointment of the B.P., 1932, which is made with a paraffin basis. When trying the process on sublimed sulphur it was observed that absorption was very slow, it being necessary to boil the mixture of reagent and sulphur for three hours in order to complete the reaction. On simulating the conditions of the B.P. ointment by adding about 1 gm. of the official simple ointment, combination of the sulphur was complete in about twenty minutes. The action of the paraffin may not be entirely physical. When assaying sulphur ointment made with a lard basis, such as the U.S.P. X preparation, it is again necessary to add about 1 gm. of soft paraffin, or simple ointment, in order to promote rapid combination of the sulphur. The process has been applied to the pharmacopœial sublimed sulphur, precipitated sulphur, ointment of sulphur, compound powder of liquorice, and confection of sulphur, and to sulphur lozenges. It is evident that the presence of sulphate will not interfere with the determination of free sulphur. The working details are as follows:—

The material to be assayed, containing about 0.1 gm. of sulphur, is accurately weighed into a conical flask of about 175-c.c. capacity. Fifty c.c. of reagent is added together with 1 gm. of simple ointment or soft paraffin. (The latter addition is not necessary in the case of ointments made with a paraffin base). After adding a little granular pumice to prevent local superheating the flask is connected to a reflux condenser and the contents vigorously boiled for thirty minutes. After cooling, 10 c.c. of formaldehyde solution is added, the mixture acidified with dilute nitric acid, and exactly 50 c.c. of $N/10$ silver nitrate added. If the material being assayed has coloured the liquid, as occurs with compound liquorice powder, it is necessary to add about 0.5 gm. of decolorising charcoal. In any case, the mixture is filtered through an asbestos pad by means of a Buchner filtering funnel and the residue washed with water. The filtrate is then titrated with $N/10$ ammonium thiocyanate using ferric alum as indicator. To determine the value of the "blank" on the reagent, 50 c.c. is mixed with 10 c.c. of formaldehyde solution, the mixture acidified with dilute nitric acid and titrated as already described. One c.c. of $N/10$ $AgNO_3$ is equivalent to 0.003206 gm. S.

Sublimed and Precipitated Sulphur.—The method gave good results with specimens of sublimed sulphur which had been dried *in vacuo* to constant weight. It is equally applicable to the precipitated variety.

Sulphur Ointment.—Oxidation methods are troublesome to apply to this preparation. The proposed method of conversion to thiocyanate yields accurate results, and a determination can easily be completed within an hour. Some of the results obtained have been compared with parallel figures yielded by the oxidation process, and in all cases the agreement was satisfactory.

Compound Liquorice Powder.—The analysis of this preparation has been the subject of some discussion in the past. In the author's experience oxidation by means of bromine and sodium hydroxide gives satisfactory results. In ordinary practice it is not necessary to allow for the sulphate naturally occurring in the vegetable ingredients of compound liquorice powder, but for the purpose of checking the accuracy of the proposed new method, allowance was made for this error in the results obtained by oxidation. In order to ensure absolute uniformity of the material taken for assay the requisite amount of each ingredient was accurately weighed into flasks, the resulting mixture being just sufficient for the determination of the sulphur. The results show excellent agreement.

Confection of Sulphur and Sulphur Lozenges.—The proposed method was found to work quite well and no special precautions are necessary. (A table is appended by the author.)

Summary

A new and rapid method is proposed for the determination of elemental sulphur, which depends upon conversion to thiocyanate by the use of potassium cyanide and triethanolamine.

The method has been proved to be applicable to both precipitated and sublimed sulphur, to all the official pharmaceutical preparations and to sulphur lozenges.

The accurate determination of free sulphur by this method is unaffected by the presence of sulphates.

The author wishes to express his thanks to the directors of The British Drug Houses, Ltd., for permission to publish this work.

Discussion

The Chairman pointed out that out-of-the-way chemicals seemed to be cropping up in analytical methods. There were some in the new B.P.—e.g., in the lead test.

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MR. BRINDLE suggested that decolorising charcoal was rather dangerous for liquids which had to be analysed afterwards. Had the charcoal been tested for the presence of sulphides, and had it adsorbed any of the sulphur?

MR. POWELL inquired if it was necessary to use charcoal.

MR. ALLPORT, in reply, said he found it necessary to use charcoal for compound liquorice powder but not for anything else. It was added to the cold solution a few moments before filtering. He used a blank solution as a check.

The last paper taken at this session was:—

Spectroscopic Investigation of Gum Acacia

BY S. JUDD LEWIS AND J. WOMBWELL

[ABSTRACT]

VARIOUS investigations show that the ash of acacia contains calcium, magnesium and potassium, but there has not been any general survey of its elemental components apart from occasional reference to the presence of aluminium, manganese, iron or other minor element. A spectroscopic exploration of this ash has provided results which are encouraging and enlightening. Eight specimens of gum acacia were obtained from Stafford Allen & Sons, Ltd., with the following descriptions:—

	Laboratory Number
Gum acacia, Kordofan, clean sorts	9393
Gum acacia, bleached	9394
Gum acacia, elect	9408
Type No. 644 Bleached gum	9409
Type No. 645 Cleaned gum	9410
Gum arabic "Talha"	9395
Type No. 646 "Talha" gum	9411
Type No. 647 "Italian" gum	9412

Samples Nos. 9408 and 9410 were cleaned by Messrs. Stafford Allen and the others were carefully cleaned by the authors to avoid the inclusion of extraneous mineral matter. Moisture was determined by drying in a water-oven to constant weight, six hours being sufficient provided the sample is reduced to fairly fine powder. Ashing was conducted by decomposing 5 gm. of gum (used for the drying) in a silica milk basin with gentle heating over a Bunsen burner until tarry matter has been discharged and then completing the ashing in a muffle at a moderately low temperature (650° to 700° C.), the weighed product being recorded as "ash" calculated on the dried gum. "Sulphated ash" was prepared by treating with slight excess of sulphuric acid with gentle heating until sulphuric acid fumes ceased to be evolved. This sulphated ash was mixed with an equal weight of spectroscopically pure ammonium sulphate and 10 mgm. pellets examined by means of a medium Hilger Quartz spectrograph in accordance with the Ratio Quantitative System of Judd Lewis (Chemistry and Industry, 51, 271). The analysis was conducted by the arc method using "H.S." copper electrodes. The quantity of each element was determined in ratio to the calcium content, and finally re-calculated in the basis that all the elements (except boron, silicon, tin, and titanium) were present in the ash as sulphates. The following table includes all the elements found in any or all of the gums:—

Negative results were normally obtained in a search for silver, beryllium, bismuth, cadmium, cobalt, lanthanum, molybdenum, phosphorus, thallium, vanadium, tungsten, and zinc, except for minute traces of bismuth in specimens 9393 and 9409, and a heavy trace of zinc in 9411. The "Italian" gum (9412) was exceptional in containing slight traces of silver, arsenic, bismuth and vanadium.

Inspection of the foregoing data shows:—

(1) Aluminium does not occur in the Kordofan gums.
(2) Barium and calcium are both variable and in general they occur in fairly constant ratio to one another.
(3) Strontium is practically uniform throughout.
(4) Iron is much higher in "Talha" gum.
(5) Potassium is remarkably low in the "Talha" gum.
(6) Lithium in minute quantity is almost universal, but is remarkably high in 9394.
(7) Magnesium is much higher in the "Talha" gum than elsewhere.
(8) Manganese is higher in "Talha" gum following its constant association with iron.
(9) Boron occurs in the "Talha" gum only, with one exception.
(10) Silicon is high in "Talha" gum (if the high figure for 9408 is regarded as exceptional).
(11) It is noticeable that both lead and tin occur in the majority.

The results may be relied upon to an accuracy of determination within one-tenth of the amount of the constituent present, be it large or small. In a preliminary examination of the absorption spectrum of two

TABLE I.

Components of the Sulphated Ash	KORDOFAN					TALHA		"ITALIAN"
	9393	9394	9408	9409	9410	9395	9411	9412
	"Clean Sorts"	"Bleached"	"Elect" "Cleaned"	"Type No. 644" "Bleached"	"Type No. 645" "Cleaned"	"Talha"	"Type No. 646" "Talha"	"Type No. 647" "Italian"
$Al_2(SO_4)_3$ ...	0	0	0	0	0	1·42	0	0·11
$BaSO_4$	0·027	0·10	0·078	0·15	0·072	0·14	0·17	0·024
$CaSO_4$	40·75	56·9	48·7	55·46	48·1	51·12	50·4	44·4
$CuSO_4$	Minute trace only in each.							
$Fe_2(SO_4)_3$ ...	0	0	0·057	0·043	0·18	0·46	0·28	0
K_2SO_4	53·5	34·7	27·2	38·2	23·7	10·7	12·6	48·9
Li_2SO_4	0·001	0·16	0·0003	0·0001	0	0·005	0	0·006
$MgSO_4$	5·23	7·75	22·9	5·74	27·30	35·4	36·0	6·44
$MnSO_4$	0	0·0013	0·0033	0	0·002	0·014	0·0078	0·0034
Na_2SO_4	0·15	0·15	0·15	0·012	0·15	0·09	0·092	0·071
$PbSO_4$	0	0·004	0·0007	0·0025	0	0·002	0·0015	0·026
$SrSO_4$	0·14	0·13	0·13	0·16	0·09	0·17	0·13	0·15
B_2O_3	0	0	0·009	0	0	0·003	0·004	0
SiO_2	0·12	0·07	0·74	0	0·40	0·39	0·28	0·07
SnO_2	0	0·003	0·0009	0·0015	0·0018	0·0009	0	0·0007
TiO_2	0	0	minute trace	minute trace (?)	0	minute trace(?)	minute trace	0
	99·92	99·97	99·96	99·77	100·0	99·92	99·96	100·2
Ash	3·29 per cent.	3·05 per cent.	3·12 per cent.	3·29 per cent.	2·96 per cent.	3·14 per cent.	2·29 per cent.	3·06 per cent.
Moisture ...	11·99	9·39	11·04	12·02	12·98	12·48	11·46	10·59

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Kordofan gums and one "Talha" gum, it was found that these exhibited absorption bands similar to those due to proteins. Tests show substantial quantities of volatile alkali in the gums and it is inferred that the nitrogen is present in two forms and varies widely. The so-called "protein" absorption band may be due to cyclic amino-acid, purines, and certain other nitrogen compounds not necessarily proteins. In addition a 10 per cent. solution of "Talha" gum possesses an intense general absorption, the cause of which is at present obscure. The preliminary work on the emission and absorption spectra of acacia gum shows the need for more extended investigation in order to understand the variations in the chemical, physical, and technological properties of acacia gum, as well as to appreciate its production biologically.

Discussion

The Chairman inquired if the author could correlate his results between mineral contents and quality.

Mr. Aitkin asked whether the proportions were constant to each species apart from considerations of soil.

Dr. Judd Lewis, in reply, pointed out that the Talha gums had low potassium and high magnesium, a fact which might distinguish them from others. The authors had not tested enough samples to answer the chairman's question.

The Chairman, in closing the session, thanked the authors of the papers presented.

Science Section

Wednesday Morning

The first paper to be taken on Wednesday morning, when there was a better attendance than usual in the Science Section, was read by Mr. C. T. Bennett on:—

The Determination of Iron

By C. T. Bennett, B.Sc., F.I.C., Ph.C., and N. R. Campbell

[Abstract]

A survey of the methods official in the British Pharmacopœia leads one to suppose that the determination of iron cannot be the matter of simple routine that one might reasonably expect it to be. There are five distinct processes outlined therein, without considering the limit test for iron, and the realisation that many other methods are used by analysts leads us to plead for greater uniformity. The authors then give particulars of the processes in use, including the methods official in the Pharmacopœia, with comments thereon. Most of these processes, state the authors, came into being as a result of particular need, that is, as occasion arose for the iron content of a particular substance or class of substances to be determined, a method was worked out and applied, presumably satisfactorily. Now that such a variety of methods is available, an attempt should be made to standardise the assay. The authors suggest that in the presence of organic matter, the most obvious procedure would involve destruction of the interfering substances by ignition or drastic methods of oxidation. This principle has not met with approval in the past, owing to the time required for these processes, and the difficulties arising through the presence of much sugar (syrups) or decrepitation during ignition (scale preparations). They have found, in certain cases, potassium permanganate in the presence of moderately dilute sulphuric acid to be a suitable oxidising agent. This reagent effectively oxidises citric and tartaric acids and hypophosphites, and may prove to be further applicable. The principles of the method which has been applied in these cases are as follows:—A weighed quantity of the iron-containing substances is treated with potassium permanganate in the presence of moderately dilute sulphuric acid and then boiled for a short time. Hydrochloric acid is added and the solution is boiled down to fairly low bulk. A dilute solution of stannous chloride is then added until the colour due to presence of ferric ions completely disappears, and, after cooling in running water, excess of solution of mercuric chloride is added. The ferrous solution is diluted with water, phosphoric acid is added, and the titration carried out with $N/10$ potassium dichromate, using solution of diphenylamine as indicator. These principles were applied to the determination of the iron content of a homogenous granular crystalline ferrous sulphate, to which was added quantities of substances whose effects upon the workings of the method were to be studied. Substances used were tartaric acid, citric acid, sodium glycerophosphate, sodium hypophosphite. The weight of potassium permanganate required was ascertained by trial. The admixture of sodium glycerophosphate was found to cause high, discordant results for the iron content of ferrous sulphate, and to interfere to the extent of forming a thick, almost gelatinous, mass in the beaker on heating with potassium permanganate and diluted sulphuric acid. This was apparently due to glycerin showing a greater resistance to destructive oxidation than the other substances studied. Results obtained are here given, poor results only being omitted when their cause was known manipulative error. The authors remark that many early results were discarded because a considerable quantity of iron was found in the potassium permanganate used. Subsequent work was carried out with potassium permanganate of analytical reagent quality, which though not completely iron-free, contained only traces of the order of 0.005 per cent. of the metal, a correction for which was applied.

Results

The following results are given:—Ferrous sulphate treated according to above method: 20.12, 20.11 per cent. of iron. Ferrous sulphate treated according to the above method with preliminary addition of 1 gm. of the following substances:—(1) Citric acid: 20.10, 20.08, 20.11, 20.15, 20.11 per cent. of iron; (2) tartaric acid: 20.12, 20.10, 20.12 per cent. of iron; (3) sodium hypophosphite: 20.11, 20.12, 20.08 per cent. of iron. Ferrous sulphate assayed by precipitation of ferric hydroxide, solution of the ignited oxide followed by reduction and titration according to above, 20.13, 20.13 per cent. of iron. Sodium glycerophosphate did not yield satisfactorily to this process of oxidation, results obtained on assaying ferrous sulphate containing 1 gm. of sodium glycerophosphate being as follows: 20.18, 20.27, 20.23 per cent. of iron where 5 gm. and 20.60 per cent. of iron where 3 gm. of potassium permanganate were employed. It will be observed that concordant, thought slightly high, results were obtained, and it was concluded that the principles of the method were sound. The method was then applied to the assay of three scale iron preparations and of ferric hypophosphite. Results obtained were rather lower than those by another method, but some degree of concordance existed between results of assays of each substance by the method proposed. One gm. was taken for each assay, and 2 to 5 gm. of potassium permanganate were added according to requirements of particular preparations, with 25 millilitres of 25 per cent. v/v solution of sulphuric acid. When the initial reaction had subsided, the contents of the covered beaker were boiled for several minutes; 25 millilitres of hydrochloric acid were added, and the process completed in accordance with principles stated above, titration being carried out in a bulk of about 150 millilitres. Iron and ammonium citrate: (B.P. method 20.45-20.55 per cent. of iron), 20.35, 20.36, 20.34, 20.32 per cent. of iron. By precipitation as ferrous sulphide, ignition to ferric oxide, solution, reduction and titration, 20.50 per cent. of iron. Iron and potassium tartrate: 17.45, 17.55, 17.54, 17.42 per cent. of iron. By precipitation as ferrous sulphide, ignition to ferric oxide, solution, reduction and titration, 17.74 per cent. of iron. Soluble iron pyrophosphate (containing citrate): 13.99, 14.04 per cent. of iron. Ferric hypophosphite: 21.95 per cent. of iron. By precipitation

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as ferrous sulphide, ignition to ferric oxide, solution, reduction and titration, 22.14 per cent. of iron.

From the analytical laboratory of Wright, Layman & Umney (1932), Ltd.

Discussion

The Chairman (Dr. Hampshire) characterised this paper as an original communication of great importance.

Mr. Bird said the paper tended to keep alive that function of the Conference mentioned by the chairman in his address. He was glad the authors had pinned their faith to potassium dichromate, which indicator is now coming into its own. He hoped the authors would perfect the process so that it may be incorporated into a future Pharmacopœia.

The Chairman pointed out that diphenylamine wants understanding, as it is not always so easy to use as might appear.

Mr. A. J. Jones called attention to the personal factor. The pharmacopœial method had given good results in their hands. He mentioned that if the end-point is difficult to distinguish a little dilution may improve it.

Mr. Bennett, in the course of his reply, said diphenylamine was a great improvement on the spotting method, and if the amount was limited it was easy to get sharp end-points. The pharmacopœial method for liq. ferri perchlor. is not a suitable one. He thought the personal factor in titrations is due to the end-point.

The next paper was:—

The Effect of Calcium Administration on the Toxicity of Carbon Tetrachloride in Mice

By Frank Wokes

[Abstract]

Fatalities occur occasionally in treating hookworm disease with carbon tetrachloride and Lamson, Minot and Robbins ("Journal of the American Medical Association," 90, 345) conclude that the toxic effect may be due to calcium deficiency and recommend the building up of an adequate calcium reserve. This possibility of altering the susceptibility to carbon tetrachloride poisoning by varying the proportion of calcium in the diet obviously needs careful exploration. The mortality doses of carbon tetrachloride of analytical purity administered (by stomach tube) to mice of 13 to 26 gm. weight approximated to a characteristic curve. A dose of 10 mils. per kilogram of body weight produced a percentage mortality of 68 per cent. and this dose was selected for use in determining the effect of calcium on the toxicity of carbon tetrachloride to mice. Two groups of mice were maintained on high (2.0 per cent. Ca) and low (0.2 per cent. Ca) calcium diet for four days. The high calcium diet contained added calcium as carbonate and it was assumed that a four day treatment permitted building up an adequate calcium reserve. Similarly it was presumed that with low calcium diet the normal reserve is depleted in this period.

The results summarised in Table I show that there was no significant difference between the susceptibility

Table I.—Effect of Variation in Calcium Content of Diet on Toxicity of Carbon Tetrachloride Administered Orally

Percentage of Calcium in Diet	Mortality produced by CCl_4 10 mils. per kgm			
	1st Expt.	2nd Expt.	Total	Percentage
2·0	12/13	15/17	27/30	90
0·2	12/14	12/14	24/28	86

of mice fed on the high calcium diet and that of mice fed on the low calcium diet. In both groups the percentage mortality was higher than on the normal diet. This experiment was repeated with two further groups of mice. Almost the same results were obtained, showing that there is little hope of affecting susceptibility by variations in the dietary calcium.

Calcium Lactate Administration

Two groups of mice were kept for eight days on a diet containing 0.4 to 0.5 per cent. of calcium. Each mouse was then given by stomach tube a dose of calcium lactate, equivalent to either 0.15 or 0.3 gm. of Ca per kgm. Exactly one hour after it had received the calcium, each mouse was given the usual dose of carbon tetrachloride (10 mils per kgm.). The period of one hour between calcium administration and carbon tetrachloride administration was chosen because it had been found in previous experiments that this was the time required for the absorption to reach its maximum. As can be seen from the results summarised in Table II, there was a

Table II.—Effect of Calcium Lactate Administration on Toxicity of Carbon Tetrachloride

Dose of Carbon Tetrachloride Mils. per kgm.	Dose of Calcium as Lactate, gm. of Ca per kgm.	Mortality Observed	Percentage Mortality	Reduction in Percentage Mortality (from 68 per cent. produced by CCl_4 alone)
10	0·15	6 out of 16	38	30
10	0·3	9 out of 19	47	21

reduction in the percentage mortality, but complete protection against carbon tetrachloride poisoning was not obtained. The dose of calcium lactate required to secure even partial protection was considerably larger than that recommended by Lamson, Minot and Robbins for human treatment (3 gm. per day). It was, in fact, the largest that could be administered to the mice. Thus increase in the amount of calcium administered failed to produce any large reduction in the susceptibility of mice towards tetrachloride poisoning such as might have been expected from previous experiments on dogs.

Discussion

The Chairman inquired whether impurities had been entirely excluded in cases in which complaints had occurred. The B.P. standard was a stringent one. The placing of the curve in the first of the author's tables suggested a difficulty.

Mr. Whitmore asked whether the calcium lactate used was freshly prepared, and whether calcium chloride had been tried.

Mr. Evers wished to know how the calcium was related to the carbon tetrachloride.

Mr. Broom pointed out the difference in the results between the administration of calcium in the animals' diet and by stomach tube. In the case of guanidine derivates, the toxicity of which, like that of carbon tetrachloride, affected the liver, he had tried calcium gluconate intravenously.

Mr. F. Browne remarked that in Fiji, where a population of 25,000 had been treated for hookworm, some must have died from other diseases. The use of large numbers of animals was subject to the same principle. Further purification of substances, if unnecessary, was to be deprecated.

Mr. Hales asked if the resistance of human beings to carbon tetrachloride was proportionate to that of mice by weight.

Mr. Walmsley referred to liver fluke in sheep. Occasionally a flock showed a high mortality. In one case a herd of cows under treatment had a mortality of 75 per cent.

Mr. Wokes, in reply, pointed out that the carbon tetrachloride used by him was of A.R. purity. In the past it might be that some of the samples were not sufficiently pure. His use of the curve referred to was conditioned by the fact that it was necessary to use a large number of animals in order to get a very accurate curve—an expensive proceeding. The calcium lactate used was freshly made each day; he had not used calcium chloride in this series of tests. The lactate was used in treating natives for hookworm. Calcium had been found to diminish the toxicity of carbon tetra-

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chloride on the liver. The dose received by stomach tube was larger than that in the diet. Deaths in using large numbers of animals were always a difficulty. A margin was allowed in transferring calculations from mice to men.

The next paper, read by the author, was on:—

The Histology of the Leaves of *Digitalis Thapsi*

By T. Dewar

[Abstract]

The leaves of *Digitalis Thapsi*, Linn., have been offered for sale in England, France, and America, and since they are reported to have two to three times the physiological activity of official digitalis leaves, it is desirable to find reliable means of distinguishing between powders from leaves of *D. Thapsi* and *D. purpurea*. This has been done by the author working in the Pharmaceutical Society's Pharmacognosy Research Laboratory. The material used was a commercial sample, presented to the Society in 1929, and consisted of leaves obtained from

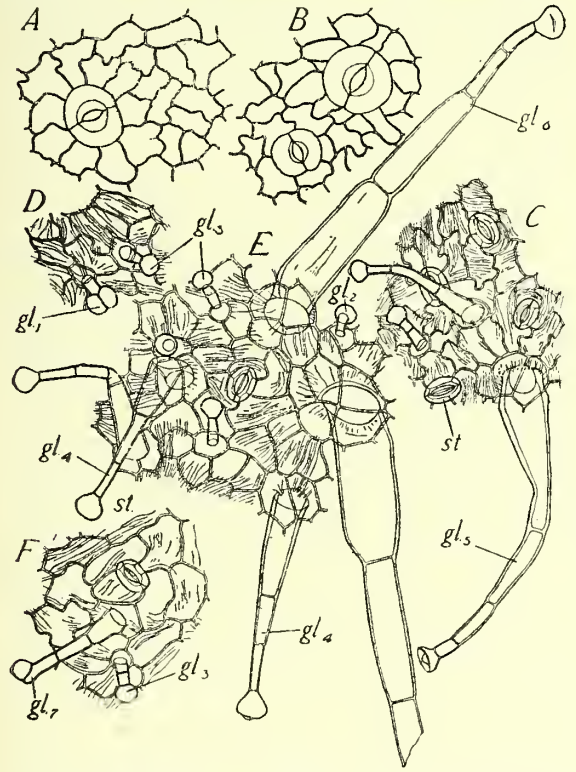

Fig. 1.—*Digitalis Thapsi*. Epidermis of leaf in surface view. A, Water pore occurring singly. B, Group of two water pores. C, Lower epidermis, interneural. D, Lower epidermis beneath a vein. E and F, Upper epidermis, interneural. *st.*, stoma; *gl.* 1, glandular trichome with bicellular head and unicellular stalk; *gl.* 2, *gl.* 3, *gl.* 4, *gl.* 5, *gl.* 6, glandular trichomes with unicellular heads; *gl.* 2, with 1-celled stalk and undivided basal cell; *gl.* 3, with 2-celled stalk and undivided basal cell; *gl.* 4, with 3-celled stalk and basal cell divided into two; *gl.* 5, with 4-celled stalk and basal cell divided into two; *gl.* 6, with 4-celled stalk and basal cell divided into four; *gl.* 7, glandular trichome with a unicellular head affixed obliquely to the terminal stalk-cell (*gl.* 7 is exceptional in this respect).

flowering plants of *D. Thapsi*. Surface preparations cleared by boiling with chloral hydrate solution (5 in 2) presented the appearance shown in Fig. 1. The cells of the upper epidermis vary in length from 25 to 65 microns and in width from 20 to 35 microns; and their anticlinal walls are straight or only slightly sinuous. The variation in cells of the lower epidermis is 15 to 60 microns in length and 12.5 to 40 microns in width whilst their anticlinal walls are sinuous and rarely straight. A distinctive feature is that the cuticle of both epidermises show well marked striations. Another characteristic is the presence on both surfaces of numerous glandular trichomes with unicellular heads (and usually with stalks of 3 or 4 cells). These occur on all parts of the leaf surface and vary from 30 microns to 1 mm. in length. Glandular trichomes with bicellular heads (and unicellular stalks) are less numerous, occurring more commonly near the veins.

As regards stomata, these are found on both surfaces and show wide variation in frequency ratio of lower/upper surface (8.92 to 1.72). There are no specially differentiated subsidiary cells surrounding a stoma, but the neighbouring cells extend beneath the guard cells and cause these to be partly raised above the general level of the epidermis. Water pores (Fig. 1, A and B) occurred on the apices of all teeth examined. Preparations displaying the upper and lower surfaces and the edge of a tooth were obtained by macerating with 5 per cent. aqueous potash for five minutes on a water bath, dissecting away all except the apex with a fine scalpel, and then opening out. Determination of palisade-ratio showed that this varied from 3 to 5 in the three leaves tested, four interneural epidermal cells being used in each of the twelve cases. Small prisms of calcium oxalate (1 to 9 microns in length and 1 to 5 microns in width) occur scattered throughout the mesophyll of the leaves, the largest being found in the parenchymatous sheath around the veinlets. The palisade parenchyma consists of two to three rows of cylindrical cells, whilst the spongy parenchyma possesses about four rows of spherical and ellipitical branched cells with marked intercellular spacings. The presence of a complete or nearly complete arc of pericyclic fibres below the vascular bundle at the base of the midrib is a useful diagnostic character. In some leaves this is complete but interrupted by collenchyma in others. The fibres diminish in number on ascending the midrib, until at the middle only a few remain, their place being taken by collenchyma. The elements of the pericycle can be readily isolated by maceration with aqueous potash (5 per cent.) on a water bath for five to ten minutes. The fibres vary in length from 0.75 mm. to 2.3 mm., and in (maximum) width from 12 to 35 microns. They are thin walled and pitted and give a scarcely perceptible reaction for lignin with phloroglucin and hydrochloric acid. The vein-islet number varied from 8.5 to 16 in the five leaves of *D. Thapsi* tested, as compared with 2 to 2.5 for *D. purpurea*. The author arrives at the following conclusions:—

(A) The characters of the powdered leaves of *Digitalis Thapsi* Linn. may be summarised as follows:—

(1) The presence on both surfaces of numerous glandular trichomes with unicellular heads, usually with 3- to 4-celled stalks.

(2) The presence on both surfaces of glandular trichomes with bicellular heads, usually with unicellular stalks.

(3) The absence of non-glandular trichomes.

(4) The cuticle of both epidermises shows well marked striations.

(5) The stomata have no specially differentiated subsidiary cells.

(6) Usually one water pore occurs on each tooth.

(7) The presence of pericyclic fibres.

(8) The presence of small prisms of calcium oxalate in the mesophyll.

(B) The characters 1, 3, 4, 7 and 8 enable these leaves to be readily distinguished from those of *Digitalis purpurea* when whole or in the form of powder.

(C) The vein islet number provides a means of distinguishing whole or broken leaves of *D. Thapsi* from those of *D. purpurea*.

Discussion

The Chairman said this was an excellent piece of work, particularly the drawings. Any species of digitalis related to the official one must be of importance.

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MR. WALLIS congratulated the author and commented on his thoroughness and perseverance.

MR. JACKSON asked if there was much visible difference between *D. purpurea* and *D. thrapsi*.

MR. CHAMINGS asked if there had been any adulteration in recent years.

PROFESSOR CASPARIS raised the question of *Digitalis lanata*.

MR. RUTHERFORD HILL said that in view of the fact that digitalis was standardised, did it matter which variety is used?

MR. DEWAR, replying, said *purpurea* leaves could easily be distinguished from *thrapsi*, but only wholesalers could throw light on what happened commercially. He had partly investigated *D. lanata*, and first-year leaves were now being grown for him. He thought there would be no difficulty in distinguishing them. There were papers available relating to the clinical action on human beings, the potency referred to had been obtained on animals.

The next paper, presented by Mr. Ware, was:—

The Precipitation of Alkaloids by Tannins and the Use of Antipyrine in the Detection of Tannins

By ALAN H. WARE and VICTOR SMITH

[ABSTRACT]

RECENT statements implying that it is the exception for alkaloids to be precipitated by tannins are shown to be erroneous. Such conclusions, drawn from the paper by Miss C. M. Fear ("Analyst," 54, 316), disregard that this relates to twenty-six alkaloidal hydrochlorides. Also that precipitation would occur with salts of weaker acids, such as usually occur in galenicals. Further, by adjustment of alkaloidal solution to PH 7, or the addition of a suitable electrolyte, it is probable that tannin will cause precipitatiou in all cases, and such conditions obtain frequently in dispensing and other pharmaceutical operations. Water-soluble alkaloidal bases (amidopyrine, antipyrine, caffeine, codeine, and colchicine) are found to be readily precipitated as tannates from aqueous solution without PH adjustment or addition of an electrolyte. Alkaloidal salts of weak acids also give copious precipitates provided the solution is not too weak and the gallotannin solution (not too strong) is carefully added. This applies to caffeine citrate, caffeine sodium benzoate (but not theobromine sodium salicylate, or theophylline sodium acetate), codeine phosphate, morphine acetate, morphine tartrate and physostigmine salicylate. As regards alkaloidal salts of strong acids, the work of Miss Fear (on hydrochlorides) is confirmed and the investigation extended to sulphates also. It was found that the following (in 1 per cent. solution) gave either a precipitate or resulted in marked opalescence:—Cinchonidine and cinchonine hydrochlorides and sulphates, quinine bisulphate, quinine hydrochloride (but not the acid hydrochloride), quinidine sulphate, strychnine hydrochloride, strychnine sulphate, brucine sulphate, and (by Fear) caffeine hydrochloride. The following alkaloidal salts gave no precipitate with gallotannin alone, but gave a decided precipitate on addition of sodium bicarbonate solution of 0.1 per cent. strength:—Amylocaine hydrochloride, apomorphine hydrochloride, arecoline sulphate, atropine sulphate, banzamine lactate, diamorphine hydrochloride, emetine hydrochloride, ephedrine hydrochloride, cocaine hydrochloride, homatropine hydrobromide, morphine hydrochloride, physostigmine sulphate, pilocarpine nitrate, and procaine hydrochloride. In a general discussion, the authors point out that the tendency to form suspensoid colloids is a more important factor than PH value. They proceed on this basis to apply the acid phosphates in conjunction with gallotannin as a routine test for alkaloids and allied nitrogen bases. This is claimed to be more specific than Dragendorff's reagent and to detect purine bases which are not precipitated by Mayer's reagent.

Method for Simple Substances.—The reagents used are a 2 per cent. aqueous solution of gallotannin, a 10 per cent. aqueous solution of acid sodium phosphate and an aqueous solution containing 5 per cent. of disodium phosphate with 10 per cent. of acid sodium phosphate. These strengths were selected for three reasons, viz. (*a*) that if equal volumes of each are admixed there is no immediate precipitation of tannin and that even after *prolonged* standing only a few small flecks of tannin appear; (*b*) that the two phosphate solutions when admixed in equal volume do not precipitate alkaloids and (*c*) that the use of the three reagents in the manner to be described brings about a more complete precipitation of alkaloids than any other method which has been examined. A little of the substance suspected of being an alkaloid is dissolved in 3 c.c. of the acid sodium phosphate solution. Most organic nitrogen bases and salts dissolve readily in the cold, but warmth is necessary in a few cases (benzocaine hydrochloride is the only substance of the class under discussion which did not appreciably dissolve; cinchonidine hydrochloride is not as soluble as most alkaloidal salts, but dissolves sufficiently to give a good reaction.) To the solution, cooled if heat has been used, add 3 c. c. of the gallotannin solution and then sufficient, but not more than 3 c.c., of the mixed phosphate solution. Shake well and filter. Some precipitation frequently occurs on adding the tannin solution, but the reaction is much more complete as a rule after the addition of the mixed phosphate.

Results.—If the substance is an alkaloid, a related organic nitrogen base or a salt of one or other of these, the following will be noted:—

(1) The compound dissolves in the acid sodium phosphate solution, and, *if no tannin* be added, is not precipitated by the addition of the mixed phosphate.

(2) If, on the other hand, to the aqueous solution of the compound and acid phosphate, both the gallotannin solution and the mixed phosphate solution be added, a bulky precipitate falls which is most frequently of a pale purplish pink colour, but may be either white or yellow. The precipitate is readily filterable, and if washed with a little cold water will be found to be more or less soluble in boiling water, the filtrate reprecipitating on cooling, especially if a little of an admixture of equal volumes of the two phosphate solutions be added.

Some 50 substances were tested, representing 31 distinct alkaloids and related nitrogen bases. Of these only three gave negative results, viz. adrenaline, benzocaine and orthocaine, and these also give negative results to Mayer's and Dragendorff's reagents, respectively. The following all give copious precipitates to this method, viz. aconitine, acriflavine, amidopyrine, amylocaine hydrochloride, antipyrine, apomorphine hydrochloride, arecoline hydrobromide, atropine and its sulphate, benzamine lactate, brucine and its sulphate, caffeine and its citrate, the hydrochlorides and sulphates of cinchonidine and cinchonine, cocaine and its hydrochloride, codeine and its phosphate, colchicine, diamorphine (heroin) hydrochloride, emetine hydrochloride, ephedrine hydrochloride, homatropine hydrobromide, morphine and its acetate, hydrochloride and tartrate, the sulphate and salicylate of physostigmine, pilocarpine nitrate, procaine hydrochloride, the sulphate, bisulphate, hydrochloride and acid hydrochloride of quinine, quinidine sulphate and strychnine and its hydrochloride and sulphate. The mixtures caffeine and sodium benzoate, theobromine sodium salicylate and theophylline sodium acetate also gave copious precipitates.

Adaptation of the Test to the Detection of Alkaloids in Admixtures, Vegetable Powders and Extractives.—If solid, the powdered substance is rubbed well out with sufficient strong solution of basic lead acetate or other suitable alkali to thoroughly moisten but not to make too wet. A concentrated extractive may be rubbed out *first* with powdered purified wood fibre (if not available powdered quassia wood answers well, nothing being extracted from it which interferes with the test). In each case the final admixture should be alkaline to litmus. Any excess of liquid may be absorbed by more wood fibre. The mixture is then well rubbed out with a suitable organic solvent (a mixture of chloroform 3, carbon tetrachloride 1 and amyl alcohol 1, usually answers well

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and possesses the advantage of being not too volatile or inflammable). The organic solvent extractive is then filtered off and shaken out well with warm 10 per cent. aqueous acid sodium phosphate (about 5 c.c.). To 3 c.c. of this acid aqueous layer is then added 3 c.c. of the 2 per cent. gallotannin solution followed by 3 c.c. of the mixed phosphate solution. The admixture is then well shaken and allowed to stand for a minute or so.

Definition of the Term Alkaloid.—It is suggested that the following definition of the term alkaloid is justified by the parallel behaviour of organic nitrogen bases with Dragendorff's reagent and with the above tannin test:—"An alkaloid is an organic nitrogenous base which is precipitated from a suitable aqueous solvent by Dragendorff's reagent and also by tannin in the presence of a suitable electrolyte."

The Use of Antipyrine as a Routine Test Reagent for Tannins

Experiments indicate that for specificity, simplicity and speed of carrying out, the test with antipyrine ranks with the iron complex method in value. The two tests are the best yet devised for detecting tannins considered as a whole group. Antipyrine possesses advantages over cinchonine salts in not giving precipitates with vegetable extracts free from tannin and being much more soluble in water.

Details of Method Used.—In the case of a freshly made water extractive, take 5 c.c. and add to it 0.5 gm. of acid sodium phosphate. Filter if necessary and pour in sufficient quantity into 5 c.c. of a 2 per cent. aqueous solution of antipyrine. Precipitation is sometimes more complete if a sufficient quantity of the mixed phosphate solution referred to in the last section be also added. If a copious precipitate is given it may be assumed that it is due to tannin. If only a slight precipitate is given repeat the experiment substituting 0.01 gm. of sodium bicarbonate for the acid sodium phosphate. Should there still be a precipitate it is quite possibly due to the presence of tannin in very small proportion. If there is no precipitate, tannin is almost certainly absent.

In the case of commercial extractives these should be diluted with at least three times as much water, the acid phosphate added in sufficient quantity to give a 10 per cent. solution, and, if precipitation occurs, the admixture sufficiently evaporated to expel the greater part of any alcohol possibly present. The admixture should then be cooled, filtered and made up to the original volume by washing the precipitate with water. It is then tested in the manner described above.

In the case of phlobatannin extractives it should be noted that dilution with water and addition of the phosphate may bring about complete precipitation of the tannin, because it is usually present in such commercial extractives (unless they are recently made) in the form of phlobaphenes. In such a case the precipitate will be soluble in *very weak* solution of ammonia and the filtrate will give a positive response to either the iron complex test for tannins or Ware's test for phlobatannins with formaldehyde.

Discussion

The Chairman, in inviting discussion, remarked that Mr. Ware had already presented papers on this subject, which he had made specially his own.

Mr. Allport inquired if the authors' method would distinguish between so-called ptomaine bases and alkaloids.

Mr. Wallis remarked that many precipitates had a characteristic form: was this the case with the authors' reagent? Was the result the same with reagent containing sodium phosphate as in a neutral solution?

Mr. Evers asked how the sensitivity of the reagent compared with that of Mayer's reagent.

Mr. Mackie expressed the view that quantities are of importance in this type of analysis: for example, some precipitates are soluble in excess of the precipitant.

Mr. Bird inquired if the reagent was specific for alkaloids. In toxological analysis a difficulty was to find reagents that were specific in this respect.

Mr. Ware, in reply, said he had had no experience with ptomaine bases. In the case of some amorphous precipitates there was possibly no definite chemical action. A mixed phosphate reagent did differ from a neutral one. The great sensitivity of the authors' reagent was shown with quinine sulphate. They worked with precise quantities when dealing with definite substances, but he did not think there was much importance in the point. The authors' method was specific as far as they had gone.

The next paper, which was read by the author, was on

A New Colour Reaction for Bismuth

By A. D. Powell

[Abstract]

Bismuth is ocasionally found in minute quantities in pharmaceutical drugs and chemicals, its presence probably being due, in most cases, to accidental contamination. When present, bismuth gives a reaction in the pharmacopœial test for lead, which is really a test for heavy metals yielding a brown or black sulphide and not forming a non-ionised complex with cyanides. As the sulphide coloration produced by bismuth is at least as sensitive as that given by lead, a very slight contamination with this non-toxic metal, amounting only to a few parts per million, may cause the substance under examination to be rejected as not of pharmacopœial purity. While experimenting with the iodide reaction as an additional test to the usual sulphide test, I found that if the yellow solution containing bismuth iodide was shaken with ether, bismuth was removed to the ethereal layer. When ether and an acid-aqueous solution were employed, lead iodide was left in the aqueous solution, but several extractions were found to be necessary to remove amounts of bismuth of the order of 1 mgm. When alcohol or acetone were added to the aqueous solution to the extent of about 30 per cent., both bismuth and lead iodide were rapidly and completely extracted. Most other metallic iodides are retained either partly or wholly by the acid solution. None of the other metals tested yields a coloured solution in ether, except antimony, and the reaction forms a very sensitive and characteristic test for the detection of minute quantities of bismuth. The colour produced is visible at a dilution of one part in a million parts of solvent, and the test is capable of detecting 5 micro-milligrammes or less of the metal under suitable conditions. As ether may contain traces of peroxides which liberate iodine and thus give a colour which masks the bismuth reaction, a trace of sodium thiosulphate may be necessary to prevent the formation of free iodine. It is preferable to use ethyl acetate as the solvent for the detection of very minute quantities. The details of the qualitative test are as follows:—To a suitable volume of the aqueous solution to be tested, for example 10 mils, add 2 mils of dilute hydrochloric acid, and about 0.5 gms. of potassium iodide. Mix and add 5 mils of industrial spirit of acetone and 5 to 10 mils of ethyl acetate. Shake and allow to separate; a red coloration in the upper layer indicates bismuth. The test may be made quantitative in the following two ways: (1) in the absence of lead, the bismuth after two extractions with ether (it is not necessary to use ethyl acetate in this test), is re-extracted from the ether solution by shaking with 5 mils of strong ammonium chloride solution, followed by two washings with 25 and 5 mils of water made faintly acid with hydrochloric acid. Preliminary washing of the ether extracts must not be made. The combined extracts are neutralised with ammonia, and the reaction adjusted by the addition of dilute hydrochloric acid, drop by drop, until an excess of one or two drops is obtained. It is preferable at this stage to remove dissolved ether by warming for a short time, after which the solution is cooled, the volume adjusted to 50 mils and 1 mil of dilute sodium sulphide solution added. A

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control test containing a definite amount of bismuth is carried through the same process and the colours matched by the usual procedure. If copper or mercury is present, the solution must be rendered alkaline and potassium cyanide added as in the pharmacopœial test. (2) In the estimation of very minute amounts of bismuth, where the presence of relatively small traces of lead in the substance tested or in the reagents renders the sulphide test uncertain, the qualitative test described above may be used as a quantitative colour test. For this purpose it is desirable to keep the volume as small as possible. The solution under test is concentrated to 1 to 5 mils and placed in a narrow-stoppered cylinder. Sufficient hydrochloric acid is added to give a concentration of about $N/2$, and about 0.2 gm. of potassium iodide is dissolved in the solution if necessary, one or two drops of $N/10$ sodium thiosulphate are added. The mixture is shaken with 5 mils of ethyl acetate. The colour produced in the upper layer is matched with a control test. Five micro-milligrammes of bismuth gives a distinct coloration, and the delicacy of the test may be still further increased by reducing the volume of ethyl acetate. The author gives also methods for the determination of bismuth in urine and the determination of very minute traces of bismuth.

This work has been carried out in the analytical laboratories of Boots Pure Drug Co., Ltd.

Discussion

Mr. Frank Browne pointed out that the determination of bismuth was usually a lengthy process, so that the quantitative method given in the paper is of great value. Any process of examination requiring over three or four hours must be ruled out.

Mr. A. H. Naylor asked if the test was liable to be vitiated by traces of iron in the ferric condition.

Mr. Allport inquired if the author had used thiourea and if so how did it compare with sensitivity?

Mr. Powell, replying, said there was no difficulty in estimating in the presence of iron. If any was extracted it would be retained by the cyanide. He had found the thiourea test less sensitive than the one he had put forward.

The next paper was:—

Chemical Tests for Strophanthus

By E. M. Smelt, B.Pharm., Ph.C.

[Abstract]

The question of colour tests was investigated as a result of a request from the Imperial Institute that the seeds of *Strophanthus Emini* should be included in the British Pharmacopœia in addition to those of *Strophanthus kombé*. The exact composition of reagents and method of procedure were not defined in the majority of descriptions of colour reactions for various strophanthus glucosides.

Preliminary experiments were made to determine the conditions producing the most distinctive colours. Results with fourteen types of reagent tested are given in Table I. Of these the following six differentiate most clearly between the residues from tinctures from official strophanthus seed and from seed of *S. Emini*:—

Sulphuric Acid Test

One mgm. (approximately) of residue is mixed with one drop of 75 per cent. v/v sulphuric acid and allowed to stand. Concentrated sulphuric acid and 65 per cent. v/v sulphuric acid (a strength frequently used) do not give such definite colours.

Ferric Chloride and Sulphuric Acid Test

One mgm. (approximately) of residue is mixed with one drop of test solution of ferric chloride, B.P., and one drop of sulphuric acid and allowed to stand.

Phenol and Hydrochloric Acid Test

One mgm. of residue (approximately) is warmed to 50°-60° C. with 5 millilitres of hydrochloric acid containing 1 per cent. w/v of phenol and allowed to stand.

Phenoldisulphonic Acid Test

One mgm. (approximately) of residue is mixed with one drop of phenoldisulphonic acid (B.P., 1914, formula) and allowed to stand.

Furfuraldehyde and Sulphuric Acid Test

One mgm. (approximately) of residue is mixed with 0.1 millilitre of 1 per cent. v/v solution of furfuraldehyde in alcohol (95 per cent.) and 0.5 millilitre of 75 per cent. v/v sulphuric acid is added, the mixture being allowed to stand.

Resorcinol and Hydrochloric Acid Test

One mgm. (approximately) of residue is heated at about 60° C. with 5 millilitres of hydrochloric acid containing 0.1 per cent. w/v of resorcinol for about five minutes.

Table I

Test	Residue from Tinct. Strophanth. B.P. (kombé)	Residue from Tinct. Strophanth. Emini
(1). Sulphuric acid ...	Green, turning brownish green in ten minutes.	Brown, turning violet-brown in ten minutes.
(2). Phosphomolybdic and sulphuric acid.	Light brown on the addition of alkali.	As B.P. tincture.
(3). Aqueous phosphomolybdic acid.	Emerald green.	As B.P. tincture.
(4). Tungsten trioxide and sulphuric acid.	Same as with sulphuric acid.	Same as with phuric acid.
(5). Vanadium pentoxide and sulphuric acid.	Brown.	As B.P. tincture.
(6). Ferric chloride and sulphuric acid.	Golden brown turning green in five minutes.	Golden brown turning deep blue-green in five minutes.
(7). Potassium dichromate and sulphuric acid.	Brown.	As B.P. tincture.
(8). Aqueous potassium dichromate and sulphuric acid.	No change.	No change.
(9). Dilute nitric acid ...	No change.	No change.
(10). Phenol and hydrochloric acid.	Red - brown tinge (persisting).	Violet (persisting).
(11). Phenoldisulphonic acid.	Green.	Brown.
(12). Furfuraldehyde and sulphuric acid.	Brownish - green in five minutes turning dark green.	Deep violet five minutes (persisting).
(13). Resorcinol and hydrochloric acid.	Red-orange (persisting).	Purple (persisting).
(14). Keller-Kiliani reaction (modified).	Dark - brown ring; green in addition on mixing.	As B.P. tincture.

It was considered advisable to apply the colour tests to other varieties of strophanthus which might be met with in commerce, viz.:—*S. kombé, S. Emini, S. gratus, S. hispidus, S. Courmonti, S. sarmentosus,* and *S. Nicholsonii.*

The procedure adopted in preparing the seeds for the tests was as follows:—0.25 gm. of the thoroughly crushed seeds was digested with 10 mils of alcohol (70 per cent.) at about 60° C. for five minutes. The mixture was cooled, filtered through a small tight plug of cotton-wool, and the filtrate evaporated to dryness on a water bath. The residue was then defatted by washing twice with a few mils of light petroleum (boiling point 50° to 60° C.).

The tests were applied to 1 mgm. portions of the defatted residue. The colours obtained with the seven species of strophanthus are given in Table II.

Table II shows that *S. kombé* and *S. Emini* are readily distinguishable from one another by the following tests:—(1) sulphuric acid, (10) phenol and hydrochloric acid, (12) furfuraldehyde and sulphuric acid, (13) resorcinol and hydrochloric acid. The colours produced by *S. Emini* are especially striking. These four tests also serve to distinguish *S. gratus* and *S. sarmentosus.* The pink tones given by *S. sarmentosus* are very characteristic, and *S. gratus* tends to produce similarly pale colours, but of a browner shade. The colours obtained with *S. Nicholsonii* might be confused with those of *S. Emini,* but the former are usually decidedly paler than the latter, particularly in test (12). Characteristic colours were not

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obtained with *S. hispidus* or with *S. Courmonti*, although it should be possible to identify either by means of the four tests enumerated above.

The tests were applied to sections of the seeds and the colours were observed with the aid of a microscope. Although the same colours were produced as with the residues employed above, the tests were considered to be less definite when applied directly to the seeds than when an alcoholic extract was used. These tests may further be employed for the identification of other varieties of strophanthus seeds. The four tests (1, 10, 12, 13) were applied to *k*-strophanthin and to ouabain. The colours specified in Table II were given by *k*-strophanthin, but the solutions obtained with ouabain were practically colourless.

Dr. C. H. Hampshire is thanked for much helpful criticism and for the interest he has taken in this work.

Summary

Fifteen colour tests were investigated with a view to finding some which would distinguish between the seeds and preparation of *S. kombé* and *S. Emini*.

Table II.

Test	*S. kombé*	*S. Emini*	*S. gratus*	*S. hispidus*	*S. Courmonti*	*S. sarmentosus*	*S. Nicholsonii*
(1) Sulphuric acid	Green.	Brown. Violet in five mins.	Orange pink.	Brownish-red.	Brown, Green at edges in ten mins.	Pink in five mins.	Brown. Violet in ten mins.
(6) Ferric chloride and sulphuric acid	Green.	Dark blue-green.	Pale brown.	Red-brown.	Yellowish-green.	Brownish-pink.	Green.
(10) Phenol and hydrochloric acid ...	Red-brown tinge.	Violet.	Almost colourless.	Brown tinge.	Brown tinge.	Almost colourless.	Violet.
(11) Phenoldisulphonic acid	Colours the same as with sulphuric acid.						
(12) Furfuraldehyde and sulphuric acid	Greenish-grey in five mins. Indigo-blue in 15 mins.	Deep violet (persisting).	Pale red-brown.	Purplish-grey.	Brown.	Pink.	Violet (paler than *S. Emini*).
(13) Resorcinol and hydrochloric acid	Red-orange.	Purple.	Pale red-orange.	As *S. kombé*.	Brown tinge.	As *S. gratus*.	Purple (paler than *S. Emini*).

Four tests are recommended for this purpose, namely, the sulphuric acid test, the phenol and hydrochloric acid test, the furfuraldehyde and sulphuric acid test and the resorcinol and hydrochloric acid test. These tests were also suitable for the identification of other varieties of strophanthus.

Discussion

Mr. Wokes, after congratulating the author, inquired whether some of the methods used could be developed quantitatively as an alternative to biological tests, and whether experiments had been made in order to obtain an idea of variations in the same species.

Mr. Wallis remarked that among the good points of the paper was the use of the defatted residue. Another was the distinction found between residues from *S. hispidus* and those from *S. kombé*.

Mr. McNeal suggested that there was something in the seeds which was soluble in alcohol and thus affected the tests.

Dr. Linnell pointed out that there were innumerable references in the literature, and one required a guide to ascertain which tests were useful; hence the value of the author's paper.

Professor Eder inquired whether extracts obtained with a mixture of sulphuric acid, glycerin and alcohol had been tried.

Miss Smelt, replying, said that no quantitative process had been worked out by her, but it was quite possible that one might be evolved. She obtained the same colours with different samples. When tests were applied to the seeds direct, a variety of colours was obtained; but with alcohol the predominant colour was better seen. She had tried extraction with a mixture of sulphuric acid, glycerin and alcohol, but found that the colour came more slowly than with her own process.

The chairman suggested that the two following papers should be read and then discussed together:—

A Comparison of the Action of Various Solvents on Defatted Cochineal

By John Rae

Following a short paper by the author (*C. & D.*, 1931, II, 118), attempts have been made to find a better solvent of the colouring matter of cochineal than the 25-per-cent. alcohol then recommended. Four samples of coccus cacti were specially obtained for these experiments. The ash value was taken and the following percentages obtained:—Dark grain, 4.6; pure grey, 4.6; black, 5.5; pure silver, 4.3. These ashes were almost completely soluble in dilute hydrochloric acid; and in all cases heavy metals, manganese, barium, strontium, calcium, chlorides, and phosphates were absent, aluminium, magnesium, and sulphates were detected. These figures show that the limit of 7 per cent. given in the B.P. is not too stringent, and possibly a limit of 6 per cent. as given in the B.P., 1914, and the U.S.P. would include all genuine samples. The figure given in the B.P.C., 1923, 10 per cent., is far too high. A quantity of each of these samples was powdered, defatted, and tinctures prepared, using 25-per-cent. alcohol, and estimated colorimetrically in acid solution as previously described; the tincture prepared from the dark grain appeared to be the darkest, and was taken as standard. The results were as follows:—Dark grain, 100; pure silver, 100; black, 80; pure grey, 40.

It was thought that possibly a better solvent than dilute alcohol could be found for cochineal, and with the object of testing this some of the silver variety was powdered, defatted, and macerated in the proportion of one in ten for seven days with the following solvents, and then filtered:—

Sample	Solvent	——
A ...	25 per cent. Alcohol ...	Control gelatinised.
B ...	25 ,, Glycerin	
C ...	50 ,, ,,	
D ...	25 ,, Ethylene glycol	
E ...	100 ,, ,,	
F ...	100 ,, Aq. chlorof. 85	Gelatinised cochineal heated to 100° C. for two hours.
G ...	25 ,, Glycerin ...	
H ...	100 ,, Aq. chlorof. 85	

The samples were then estimated colorimetrically as before, and the results are:—A, taken as standard and given the value of 100; C, 140; D, 130; E, 150; G, 130; H, 100.

It was then decided to compare the tinctorial value of sample E made with ethylene glycol with some liquor cocci, B.P.C., prepared from the same sample of cochineal (whole and not defatted). Estimated colorimetrically in acid solution, sample E was found to be

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approximately 20 per cent. stronger. Since ethylene glycol has been shown to be practically non-toxic, it is suggested that the solution of the colouring matter of cochineal prepared by macerating one part of defatted cochineal with ten parts of ethylene glycol for seven days, and filtering, will be an improvement on the existing preparations.

SUMMARY

It is suggested that an ash limit of 6 per cent. would include all genuine samples of coccus cacti, and the figure given in the B.P.C., 1923, requires amending.

It is shown that ethylene glycol is an excellent solvent of defatted cochineal, producing a solution which is approximately 50 per cent. stronger in tinctorial value than one made with 25-per-cent. alcohol, and 20 per cent. stronger than liquor cocci, B.P.C.

The author desires to express his thanks to Messrs. Roberts, Evans and Woodhead, of Liverpool, and to Stafford Allen & Sons, Ltd., for specially obtaining the samples of cochineal used in this investigation, which is published from the laboratories of Clay & Abraham, Ltd.

Compound Tincture of Cardamom B.P.: The Loss of Colour in Certain Mixtures

By CHARLES M. CAINES and NORMAN EVERS

[ABSTRACT]

THE fading of colour which occurs in certain prescriptions dispensed with tinct. cardam. co. B.P. especially when alkaline is a matter of common knowledge. The authors were led to investigate the matter further by statements that the B.P. 1932 tincture faded more rapidly than that of the B.P. 1914. Preliminary investigation showed that tinctures of cochineal prepared in the same proportions and with the same menstrua as the compound tinctures of cardamom of the B.P., 1932 and 1914, behaved in exactly the same way as the compound tinctures themselves. For the sake of simplicity, therefore, all the subsequent experiments have been carried out with two tinctures of cochineal prepared in this way from the same sample of cochineal. For convenience these two tinctures will be referred to throughout the paper as tinct. cocci (1932) and tinct. cocci (1914). We found that the tinct. cocci (1932) was somewhat deeper in colour than the tinct. cocci (1914). Since it is well known that fading occurs in prescriptions containing spt. ammon. aromat., a series of mixtures was prepared containing definite amounts of the special tinctures of cochineal and varying amounts of solution of ammonia of the same strength as spt. ammon. aromat. B.P. (liq. ammoniae 2.2 per cent.). These mixtures were filled into well-corked white glass bottles leaving very little air-space and placed in bright daylight. After a short time it was observed that the more alkaline mixtures were fading. Comparative experiments kept in the dark showed slower fading, suggesting that the fading was due, in part at any rate, to the action of light. The next series of experiments was devised to discover how far the fading was due to alkalinity. Four series of buffer solutions of PH values 7.0, 7.5, 8.0, 8.5, 9.0, 9.5 and 10.5 were prepared and amounts of the special tinctures of cochineal were added to them so as to give the same dilution as in the previous series. Two series were prepared with tinct. cocci (1914) and two with tinct. cocci (1932), one of each being kept in the dark and the other exposed to strong daylight.

It appears that the following conclusions may be drawn from these results:—

(i) In the dark between the PH values of 7.0 and 9.5 the colour is fairly stable.

(ii) Fading occurs in the light. This is slight at PH 7.0, but increases with increase of PH.

(iii) At PH 10 and over decolorisation occurs in the dark as well as in the light.

(iv) There is little difference to be observed between the rate of fading of the mixtures prepared with tinct. cocci (1932) and tinct. cocci (1914).

Comparative Effects of Light and Oxidation

A mixture was prepared according to the following formula:—

Tinct. cocci. (1932)	...	45 minims.
Liq. ammoniæ (2.2 per cent.)	...	20 minims.
Aq. dest.	ad	2 fl. oz.

Part of this mixture was placed in a well-stoppered bottle with a minimum quantity of air and exposed to bright daylight. Another part was placed in an amber bottle and a slow current of filtered carbon dioxide-free air was bubbled through. After six hours the liquid in the bottle exposed to daylight was completely decolorised, whereas the liquid in the bottle exposed to air had diminished in colour from 19 to 13.8 Lovibond red units. Although the liquid still remained alkaline the ammonia had been largely removed by the current of air. This experiment was therefore strictly comparative. Further tests were therefore carried out in which buffer solutions were used with the same, so that the PH of the mixture was unaffected by passing air through it.

At PH 9.5 air has practically no effect, but light causes rapid fading; at PH 10.5 air has most effect, but light causes only slightly more rapid fading than that which occurs in the dark. The colour of a mixture which has been decolorised cannot be restored by either reducing or oxidising agents.

Effect of Bromides and Sodium Bicarbonate

Statements concerning the effect of bromides on the colour of the compound tincture of cardamom have been made. From our results we conclude that this effect is entirely due to the PH of the solution and that the presence of bromides, provided that they are neutral, has no effect on the decolorisation. Some of the mixtures containing ammonia were also prepared with the addition of 15 gr. of potassium or sodium bromide per fl. oz., but no alteration in the rate of fading occurred. The same conclusions also apply to the presence of sodium bicarbonate, the effect depending entirely on the PH of the mixture.

The Effect of Calcium

A series of tests was carried out to find out under what conditions of PH this precipitation occurred. The table below shows the composition of the mixtures and the results:—

Tinc. cocci (1932)	Tap water	N/10H_2SO_4 c.c.	PH of resulting mixture	Precipitation of colouring matter
A. 2 fl. dr. ...	to 2 fl. oz.	1·0	6·59	Complete
B. 2 fl. dr. ...	to 2 fl. oz.	2·0	6·10	Complete
C. 2 fl. dr. ...	to 2 fl. oz.	2·5	5·80	Almost complete
D. 2 fl. dr. ...	to 2 fl. oz.	2·75	5·70	Almost complete
E. 2 fl. dr. ...	to 2 fl. oz.	2·75	5·70	Almost complete
E. 2 fl. dr. ...	to 2 fl. oz.	3·0	5·37	Less precipitation
F. 2 fl. dr. ...	to 2 fl. oz.	3·5	4·78	Slight precipitation
G. 2 fl. dr. ...	to 2 fl. oz.	4·0	3·77	No precipitation

This shows that except in acid solutions of PH less than 4.0 precipitation of colouring matter will always occur in the presence of calcium salts.

Effect of Magnesium Salts

It was found that magnesium salts do not cause precipitation in the same way as calcium salts.

SUMMARY

(1) Decolorisation occurring in mixtures containing compound tincture of cardamom B.P. is due to the alkalinity of the mixtures.

(2) From PH 7.0 to 9.5 mixtures are fairly stable in the dark and are not sensitive to oxidation, but are decolorised by exposure to light.

(3) At PH values above 9.5 fading occurs in the dark as well as in the light and is hastened by oxidation.

(4) There is little difference to be observed in the rate of fading of mixtures prepared with tinct. cardam. co. B.P., 1932 and B.P., 1914.

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(5) Calcium salts cause the precipitation of calcium carminate in the form of a black precipitate at PH values of 4 and upwards.

(6) Magnesium salts do not precipitate the colouring matter in the same way as calcium salts.

DISCUSSION

THE CHAIRMAN said that a paper on tinct. card. co. seems to be essential to the Conference, but there are still some matters to settle regarding it.

MR. RUTHERFORD HILL said McCutcheon has suggested the use of essential oils instead of crude drugs. There was also the question of the formation of lakes, e.g., with bismuth, but there seems to be a general view that cochineal is the ingredient that causes the trouble. Hunter, of Aberdeen, had found that some tinctures of cardamom decolorised and some did not with solutions of potassium bromide. The use of a synthetic dye had been suggested.

MR. BIRD said there would always be trouble with alkaline mixtures containing tr. card. co. He supported the use of a synthetic dye.

MR. WALLIS asked if the tinctorial power of the cochineal could not be used to test the quality.

MR. FORSTER, after referring to some of his own experiences, said if sugar were used in place of glycerin it might prevent precipitation.

MISS SMELT spoke of the tests undertaken in connection with the 1932 B.P. The present preparation had been found superior to its immediate predecessors.

MR. RAE said he could confirm the results of Mr. Caines. Cochineal was originally adulterated with kermes, and a tincture made from that did not decolorise with alkalis.

MR. DEANE pointed out that the ash limit was based on only four samples. The figure in the Pharmacopœia was based on a large number of samples and was fairly representative. The figures were also on that dried at 100°. The ash limit might not mean adulteration, and an impracticably high standard was to be deprecated. Regarding ethylene glycol, he was as yet sceptical regarding its harmlessness.

MR. WHITMORE found the colour change for tr. card. co. in alkaline solution more marked than with that of the 1914 B.P. The alteration in the formula did not seem to account for this effect.

MR. HALES asked if cudbear could be substituted for the cochineal.

REPLIES

MR. RAE, who replied first, said he had tried estimation with calx chlorinata, but had not found it satisfactory. His samples were dried at 100°. He still thought the B.P.C. limit too high. Ethylene glycol was believed to be harmless, even in massive doses; but the thorough testing of new solvents was, he agreed, important.

MR. EVERS said that Mr. Caines and he might claim to have carried the old problem of compound tincture of cardamom one stage further. Mr. Cutcheon's results with bromides of potassium and sodium were probably due to differences in alkalinity. Pharmacists might well get over their prejudices with regard to aniline dyes. The authors had not gone into the question of bismuth. The difficulty with regard to fading suggested another condition. Complaints of precipitation with calcium (probably from tap-water) were still met with. Cudbear was less satisfactory than cochineal, as it was very easily reduced.

The last paper taken at this session was:—

The Decomposition of Acetylsalicylic Acid in Aqueous Solution

By C. MORTON

[ABSTRACT]

IN view of the fact that many pharmacists store mist. acetylsal. N.F. in the form of a stock mixture it is desirable to know the velocity of decomposition of acetylsalicylic acid when alkali-metal citrates, acetates, and bicarbonates are used to effect its solution in water. The progress of hydrolysis may readily be followed by titration with standard alkali, the excess of alkali-metal salt not affecting accuracy seriously providing a suitable indicator is selected. However, in the case of an ammonium salt it is necessary to condense the ammonia by means of formaldehyde prior to titration with a correction for increase in titre due to acid (especially acetic acid) liberated during such condensation. The titration method is inapplicable to solutions containing carbonates and bicarbonates owing to loss of carbon dioxide. The end-points are indefinite in titrations of ammonium acetate solution owing to interaction between the excess of formaldehyde and acetylsalicylic acid, and consequently results are somewhat unsatisfactory in this case. All the solutions decompose to the extent of over 10 per cent. during the first day and become approximately 50 per cent. hydrolysed in the course of a week. Hence the use of stock mixtures is inadmissible. From the point of view of stability the concentration and choice of solvent salt is immaterial, the rate of decomposition being independent of both salt concentration and concentration of acetylsalicylic acid. The rate of hydrolysis increases rapidly rise of temperature and at boiling point of water there is complete and almost immediate decomposition. It is thus important that heat should not be used to hasten solution of acetylsalicylic acid. The velocity constant for the unimolecular reaction is 0.0043 at normal air temperatures.

DISCUSSION

THE CHAIRMAN raised the question of the decomposition of acetylsalicylic acid by water alone. In some rough tests made for a particular purpose he had found considerable decomposition.

MR. TREVES BROWN asked if it made any practical difference whether a patient was taking aspirin or a decomposition product of it.

MR. CORFIELD said that the Codex Revision Committee had considered a mixture containing suspended aspirin: they were satisfied that an ordinary suspension in water decomposed to the extent of only about 2 per cent. in ten days.

MR. FORSTER said that in the case of a mixture in the National N.H.I. Formulary containing potassium citrate, crystals and a pinkish colour developed.

MR. DESMOND asked if there was any way in which hydrolysis could be delayed.

MR. WALMSLEY pointed out that many medical men preferred a mixture containing potassium citrate.

THE CHAIRMAN said he was inclined to wonder whether it was worth while making aspirin. (Laughter.)

MR. MORTON, replying, agreed that the rate of decomposition was less in suspension than in solution. Acetylsalicylic must dissolve before it could decompose. When a medical man prescribed aspirin we had to assume that he intended it to be present. There was no way of delaying hydrolysis in solutions, which were probably most stable about neutrality point. The only alternative would be a solution in alcohol, which would not be suitable.

The Section then adjourned for lunch.

Science Section

Wednesday Afternoon

After lunch, Mr. Treves Brown read his paper on:—

Mistura Bismuthi Hydroxidi

By H. TREVES BROWN

[ABSTRACT]

ONE disadvantage of the administration of carbonates or bicarbonates as antacids is that the carbon dioxide liberated in the stomach stimulates further secretion of

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gastric juice. It was therefore thought that a suspension of finely-divided bismuth hydroxide, or hydrated bismuth oxide, would be a useful medicament in those cases requiring the adsorptive and protective action of bismuth compounds without the evolution of carbon dioxide. In connection with the revision of the British Pharmaceutical Codex, a formula has been devised for a suspension of hydrated bismuth oxide suitable for internal use and in this paper an account is given of the work on which this formula is based. The following features may be regarded as essential in such a preparation:—

(1) It should be as free as possible from carbonate and nitrate.
(2) It should be white, opaque and of a creamy consistence.
(3) There should be very little separation even on prolonged standing.

A large number of trial batches of bismuth hydroxide suspensions were prepared by interaction of a solution of bismuth subnitrate in diluted nitric acid with dilute solution of sodium hydroxide. The conditions of concentration, temperature, etc., under which the precipitation took place were varied and the nitrate content of the products was determined. As a result of the experience gained in making these, the following conditions were found desirable:—

(A) The acid solution of bismuth subnitrate should not contain more water than necessary to effect rapid solution.
(B) The cold bismuth solution should be added as rapidly as possible to the well agitated sodium hydroxide solution.
(C) The solution of sodium hydroxide should be as dilute as considerations of bulk will allow.
(D) The precipitate should not be exposed to the atmosphere during washing.
(E) The alkali should be present in slight excess of the quantity necessary for neutralisation of the free and combined nitric acid.
(F) The excess of alkali should be removed by decantation as rapidly as possible.

A, C and E favour the production of a suspension with a low nitrate content. B favours the production of a finely divided, bulky precipitate. D prevents the formation of carbonate by absorption of atmospheric carbon dioxide, which takes place very readily. F prevents the transformation of the hydrated oxide into a yellow, crystalline compound stated to be the oxide, Bi_2O_3.

The following process has been devised, and accepted provisionally by the Codex Revision Committee for inclusion in the next edition of the British Pharmaceutical Codex under the name "Mistura Bismuthi Hydroxidi." The proposed standard for the preparation is also given:—

Bismuth subnitrate	125 gm.
Nitric acid	90 mil
Sodium hydroxide	90 gm.
Distilled water	to 1,000 mil

Mix the bismuth subnitrate with 75 millilitres of distilled water, add the nitric acid and warm gently until solution is effected. Dissolve the sodium hydroxide in 5,000 millimetres of water and add the bismuth solution quickly, in one quantity, stirring rapidly. Allow the precipitate to subside and pour off the clear liquid; collect the precipitate on a calico strainer and wash with water, maintaining a layer of liquid above the precipitate, until the washings are neutral to phenolphthalein; allow the residue to drain and mix it with sufficient distilled water to produce the required volume.

(*Standard*)

Mixture of bismuth hydroxide yields on evaporating to dryness and igniting the residue not less than 9 per cent. w/v and not more than 11 per cent. w/v of Bi_2O_3. To 1 millilitre of a 5 per cent. v/v dilution add 5 drops of phenoldisulphonic acid and evaporate to dryness on a water bath. Add 10 millilitres of dilute solution of ammonia, filter and wash the precipitate with water until the mixed filtrate and washings measure 100 millilitres. The colour of the resulting liquid is not deeper than that obtained by similarly treating 1 millilitre of a 0.01 per cent. w/v solution of potassium nitrate (limit of nitrate). A sample taken from a litre batch prepared according to the above formula was found to contain 9.29 per cent. w/w or 10.02 per cent. w/v of bismuth as Bi_2O_3, and 0.27 per cent. w/w or 0.29 per cent. w/v of nitrate as $BiONO_3,H_2O$. The amount of nitrate present in 2 fluid drachms of this preparation is less than two-thirds of the quantity permitted in the maximum dose of bismuth carbonate in the B.P., 1932. The above standard for nitrate corresponds to about three times this amount, so that no difficulty should be experienced in obtaining the mixture on a commercial scale in a form snfficiently pure to comply with it.

Proposed New Formulas for the British Pharmaceutical Codex

By H. Treves Brown

[Abstract]

The following paper gives a selection of formulas, together with an account of the work carried out thereon in the Codex Laboratory.

Extractum Ergotæ

There is still a demand for a soft extract, particularly for administration in the form of pills. Four samples of extractum ergotæ, B.P., 1914, obtained from various wholesale houses were found to contain only the faintest trace of alkaloid. Messrs. W. Ransom & Son, of Hitchin, supplied two further samples made from Russian and Portuguese ergot respectively, by the method of B.P., 1914. These had been found pharmacologically active, but contained only traces of alkaloid. The view generally held that water is an unsuitable medium for extracting ergot was supported by these samples. Experiments were therefore made with a menstruum consisting of alcohol (50 per cent.) containing 0.4 per cent. v/v of sulphuric acid, with subsequent removal of excess acid by calcium carbonate. The following formula is suggested:—

Ergot, in moderately fine powder ...	1,000 gm.
Sulphuric acid	A sufficient quantity
Alcohol (50 per cent.)	A sufficient quantity
Liquid glucose	A sufficient quantity

Percolate the ergot with light petroleum (boiling point 40° to 50° C.) until 1 mil of the percolate leaves not more than a barely perceptible film when evaporated in a glass basin. Dry the powder by exposure to air completing the drying if necessary in a current of air at a temperature not exceeding 40°. Again reduce it to powder, moisten it with a sufficient quantity of a mixture of 4 volumes of sulphuric acid and 1,000 volumes of alcohol (50 per cent.) to render it evenly damp, and set aside in a tightly closed container for four hours. Place in a percolator, add a sufficient quantity of the acidified alcohol to saturate the drug and leave a layer of liquid above and, when the liquid commences to drop from the percolator, close the outlet and macerate for forty-eight hours. Then allow percolation to proceed slowly, using as menstruum a mixture of sulphuric acid and alcohol (50 per cent.) in the same proportions as before and continuing the percolation until 6,000 mils of percolate have been collected. Add to the percolate a slight excess of calcium carbonate, stir well and allow to stand with occasional stirring until effervescence ceases. Filter and evaporate the filtrate as rapidly as possible under reduced pressure at a temperature not exceeding 40° C. to a soft extract. Determine the proportion of alkaloids in the product and add sufficient liquid glucose to produce an extract of the required strength. *Standard* 0.5 per cent. by weight of total alkaloids calculated as ergotoxine. It should be stored in well-closed containers in a cool place. When stored it loses activity.

Messrs. Ransom & Sons have tried out this process on a commercial scale, and the extract, when examined

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nearly one month after preparation, contained 1.0 per cent. of alkaloids. Since the above investigation was carried out, the work of Chassar Moir (British Medical Journal, 1, 1119) has reopened the question as to what is the action required from ergot. The fact that the liquid extract of the uew B.P. contains the active principle, of which the existence was demonstrated by Chassar Moir, suggests that both the newly discovered action and the ergotoxine action are obtainable from the extract prepared with acidified 50-per-cent. alcohol. It may therefore be assumed that the extract obtained by the above process contains all the known activity of the drug.

Liquor Azorubri

Cochineal and cudbear are far from ideal as colouring agents for pharmaceutical preparations, and it was considered desirable to explore the possibility of replacing both by a synthetic dye. At last year's Conference, Eastland suggested the use of dye No. 88 in the Colour Index. This is known by a variety of names, the commonest of which is Bordeaux B, and it is proposed to include it in the Codex under the name Azorubrum. It gives a good carmine-red colour in acid or in alkaline liquids, is readily soluble in water and alcohol, and is fast to light. A 1-per-cent. solution is a convenient strength, the only difficulty being preservation. It was found that 25 per cent. v/v of glycerine (as proposed by Eastland) does not prevent fungoid growths. Although the use of a volatile preservative is open to criticism in a solution likely to be used frequently in small quantities, a combination of chloroform and glycerin has proved quite satisfactory. The formula proposed for inclusion under the name Liquor Azorubri is:—

Bordeaux B (Colour Index No. 88)...	10 gm.
Glycerin	250 mils
Chloroform water	to 1,000 mils

Dissolve the Bordeaux B in 700 mils of chloroform water, warming slightly, if necessary, add the glycerin, cool, and add sufficient chloroform water to produce the required volume. This solution has been tried in a large number of B.P.C. preparations which have previously been coloured with cochineal, carmine, or cudbear; it has proved completely satisfactory, and in some cases distinctly superior to the vegetable colours. The solution possesses approximately the same tinctorial power as tincture of cudbear, and for most purposes, the use of 10 minims per fluid ounce of preparation will be found satisfactory.

Liquor Tartrazinæ Compositus

The inclusion of a solution of a light-fast dye to replace the tincture and glycerin of saffron would be useful. After a large number of trials it was found that tartrazine (colour index, No. 640) could be combined with either tropæoline 000 or orange-G (colour index, No. 27) to give the desired colour. Tropæoline 000 was found too sensitive to PH changes, and the following formula was proposed for inclusion as Liquor Tartrazinæ Compositus:—

Tartrazine (Colour Index No. 640)...	7·5 gm.
Orange-G (Colour Index No. 27) ...	2·5 gm.
Glycerin	250·0 mils
Chloroform water	to 1,000·0 mils

Dissolve the dyes in part of the chloroform water, add the glycerin and sufficient chloroform water to produce the required volume. The addition of chloroform is again necessary; solutions prepared with glycerin and distilled water become fungoid in a day or two and the minimum proportion of glycerin alone necessary for adequate preservation was found to be 40 per cent v/v. The above solution has been tried in the proportion of 5 minims per fluid ounce in a number of B.P.C. preparations previously coloured with tincture of saffron or glycerin of saffron; on exposing the preparations to light for a few weeks, the superiority over saffron was clearly shown.

Mistura Magnesii Hydroxidi et Paraffini Liquidi

It was considered desirable to include in the B.P.C. a formula which could be made up easily at the dispensing counter. When the two liquids are shaken together the oil is emulsified to a certain extent, but the product is far from elegant. It was found necessary to use acacia as the emulsifying agent, and the following formula has been accepted provisionally. Experiments on the keeping properties of the emulsion have so far suggested that no preservative need be added:—

Liquid paraffin	300 mils
Acacia, in powder	75 gm.
Vanillin, in powder	0·03 gm.
Mixture of magnesium hydroxide	to 1,000 mils

Triturate the acacia and vanillin with the liquid paraffin; add in one quantity 150 millilitres of mixture of magnesium hydroxide and triturate briskly until emulsified; then add sufficient mixture of magnesium hydroxide to produce the required volume.

Nebula Adrenalinæ Aromatica

The preparation in the B.P.C., 1923, contains about 80 per cent. of castor oil which has been found to block an atomiser capable of dealing with less viscous oils. The modification proposed is merely to replace part of the castor oil by arachis oil and to omit the boric acid which was found to yield a cloudy product. The revised formula is as follows:—

Adrenaline	1 gm.
Dehydrated alcohol	125 mils
Hydrochloric acid	A sufficient quantity
Eucalyptol	50 mils
Oil of sweet birch	20 mils
Castor oil	500 mils
Arachis oil	to 1,000 mils

Add the adrenaline to the dehydrated alcohol and very cautiously add just sufficient hydrochloric acid to dissolve it, approximately 0.8 mil; the acid may be conveniently applied by means of a glass rod dipped alternately into the acid and the alcoholic solution, and shaking the mixture after each addition of acid. When solution of the adrenaline is complete, mix with the castor oil, then add the eucalyptol, oil of sweet birch and sufficient arachis oil to produce the required volume. The product is readily vaporised by small atomisers and may be diluted in any desired proportion with olive oil or arachis oil. Samples in partly-filled bottles exposed to bright light soon show discoloration, but those in completely filled bottles exposed to the light and all samples stored in the dark appear to keep indefinitely.

Nebula Adrenalinæ et Ephedrinæ Oleosa

A spray containing both adrenaline and ephedrine in oily solution has also been provisionally accepted for inclusion. The formula for this is based on the above, and is as follows:—

Adrenaline	0·1 gm.
Ephedrine	20·0 gm.
Dehydrated alcohol	125·0 mils
Hydrochloric acid	A sufficient quantity
Menthol	20·0 gm.
Eucalyptol	8·0 mils
Castor oil	500·0 mils
Arachis oil	to 1,000·0 mils

Add the adrenaline to the dehydrated alcohol and very cautiously add just sufficient hydrochloric acid to dissolve it, applying it by means of a glass rod which is dipped alternately into the acid and the alcoholic solution and shaking the mixture after each addition of acid. Dissolve the ephedrine, menthol and eucalyptol in the alcoholic liquid, mix with the castor oil and add sufficient arachis oil to produce the required volume.

This spray should be kept in completely filled bottles, and it is particularly important that it should be protected from light. A sample stored in the dark in a partly filled bottle was quite satisfactory after eleven months. A portion of the same sample exposed to light had developed a very nauseous odour in about four weeks, due probably to decomposition of the adrenaline.

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Oleum Ricini Aromaticum

The small modification in the disagreeable characters of castor oil by the formula of the B.P.C., 1923, does not justify the expense of the inclusion of 5 per cent. of dehydrated alcohol, and the following is proposed:—

Saccharin	0·4 gm.
Vanillin	0·9 gm.
Chloroform	1·3 mils
Oil of cinnamon	2·6 mils
Oil of clove	2·6 mils
Oil of pimento	2·6 mils
Castor oil to	1,000·0 mils

Mix the oils with the chloroform, add the saccharin and vanillin, warm gently until dissolved, and mix with the castor oil.

Pasta Magnesii Sulphatis

In Morison's original formula the paste is made by mixing 1.5 lb. of partially dried magnesium sulphate (containing 39 per cent. of water) with 11 oz. of glycerin of phenol. This separates somewhat on long standing and the lower opaque layer is difficult to mix with the clear supernatant liquid. A salt of the composition $MgSO_4$, $2H_2O$ is obtained when magnesium sulphate crystals are dried to constant weight at 100°, the loss in weight amounting to about 37 per cent. The formula proposed is therefore as follows:—

Magnesium sulphate, dried at 100° until it has lost about 37 per cent. of its weight, finely powdered	500 gm.
Glycerin	500 gm.
Phenol	5 gm.

Triturate the phenol with the glycerin in a warm mortar and gradually add the dried magnesium sulphate. Samples prepared from this formula have been found to harden much less readily than those prepared with a commercial exsiccated magnesium sulphate containing about 34 per cent. of water and corresponding to crystals dried until the loss in weight amounts to about 25 per cent. It may be mentioned that Morison originally included the phenol as an analgesic in the belief that the application would be painful, and when this was found to be erroneous, it was omitted; it is included in the above formula as an antiseptic.

Pasta Tragacanthæ Composita (Synonym.—*Pasta Lubricans*)

The non-oily catheter lubricant of the B.P.C., 1923, is satisfactory as a lubricant, but the objection has been raised that when used, for example, on a cystoscope, the mirror of the instrument becomes misty on introduction. Replacing the water by decoction of Irish moss effects a great improvement. The Committee were advised that a perfumed mildly antiseptic preparation would be preferred and the following formula was devised:—

Tragacanth	10 gm.
Boric acid	30 gm.
Oil of lavender	5 mils
Glycerin	100 mils
Decoction of Irish moss to	1,000 mils

Triturate the tragacanth and boric acid with the oil of lavender and glycerin and gradually add the decoction of Irish moss. Sterilise by heating in an autoclave or by tyndallisation and transfer to collapsible tubes previously sterilised. A sample prepared to this formula has been tested clinically, and the report received showed that it was very satisfactory.

Syrupus Glycerophosphatum cum Pepsino Compositus

(Synonym.—*Syrupus Glycerophosphatum Compositus (Robin)*)

In the absence of a standard formula, the variations in commercial products supplied under this name are substantial. The most important variation is in the strychnine content; while some preparations contain tincture of ignatia as in Robin's original formula, others are completely free from poisonous alkaloids. The chief differences in Robin's formula when compared with that for compound syrup of glycerophosphates, B.P.C., are the inclusion of diastase and pepsin, the use of tincture of ignatia instead of strychnine, the use of tincture of kola instead of caffeine, and, lastly, the use of syrup of cherries. The flavour usually associated with Robin's syrup is very different from that of Syrupus Cerasi, B.P.C., and it was decided to flavour the syrup with other materials readily available in the pharmacy. Diastase has been omitted as being a useless complication. The B.P.C. tincture and extract of kola give a precipitate on dilution and a bulky precipitate when mixed with the other ingredients so that caffeine has been retained. The following formula is, therefore, proposed:—

Calcium glycerophosphate	22·8 gm.
Magnesium glycerophosphate	11·4 gm.
Iron glycerophosphate	5·7 gm.
Solution of potassium glycerophosphate	22·8 gm.
Solution of sodium glycerophosphate	22·8 gm.
Glycerophosphoric acid	20·8 mils
Potassium citrate	11·4 gm.
Pepsin	6·9 gm.
Caffeine	5·7 gm.
Oil of bitter almonds, S.A.P.	0·05 mil
Vanillin	0·2 gm.
Tincture of ignatia	31·2 mils
Chloroform	1·0 mil
Solution of Bordeaux-B	31·2 mils
Glycerin	200·0 mils
Sucrose	400·0 gm.
Distilled water to	1,000·0 mils

Dissolve the potassium citrate in 300 millilitres of distilled water, add the solutions of potassium glycerophosphate and sodium glycerophosphate and dissolve the calcium, magnesium and iron glycerophosphates in the mixture; add the glycerophosphoric acid and the pepsin provement was the replacement of the alkali glycerophos- Then add the glycerin and a solution of the caffeine in 50 millilitres of hot distilled water, filter if necessary, dissolve the sucrose in the filtrate, add the solution of Bordeaux-B, followed by the chloroform, vanillin and oil of bitter almond dissolved in the tincture of ignatia and sufficient distilled water to produce the required volume.

Potassium citrate was found best to increase the solubility of calcium glycerophosphate. A further improvement was the replacement of the alkali glycerophosphates in the present B.P.C. formula, which consist of the β-salts, with solutions of potassium and sodium glycerophosphate, which contain mainly the α-salts.

A number of samples prepared from this formula have been stored under various conditions, and all have remained clear. Attempts were made to ferment some of the samples by means of yeast, but no decomposition took place. In spite of its 17 ingredients, the syrup appears to be perfectly stable. The formula is doubtless open to the charge of being a bad example of "polypharmacy," but so long as the demand continues for a preparation of this type a complicated formula is unavoidable.

Discussion

The Chairman, in inviting discussion, said he would like some assurance that dyes according to the Colour Index are constant in their tinctorial contents. The formula for syr. glycerophos. cum pepsin. co. seemed to be a backward step and he regretted that there should be a demand for a preparation of this type of polypharmacy.

Mr. Short said that before adopting aniline colours they ought to be standardised in some way. He suggests some inorganic standard. As regards ol. ricini arom., amyl acetate by itself would be rather nauseating and vanillin would be an improvement.

Mr. Evers said he had had an extract of ergot for over a year which had gone down by only 0.03 per cent. As regards past, trag, co. he inquired if it had been kept for some time, as the boric acid might crystallise out.

Mr. Deane asked if there was a special reason for sulphuric acid in place of tartaric acid. He supported the statements as to the unreliability of aniline dyes.

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MR. ALLPORT foresees trouble in regard to dyes in pharmaceutical preparations. The alternative is the tintometer. Organic salts in practice fade and are not so stable as one might expect.

MR. WALMSLEY raised the question of standardised glycerophosphates.

MR. MCNEAL thought the colour theory was being developed on colour alone. He pointed out that aniline dyes are used medicinally.

MR. WHITMORE said glycerophosphates from different sources gave different results. Glycerin of commerce contains water and he wondered if this would cause the sulphate to crystallise out.

MR. CHAMINGS questioned the necessity for the number of oils used in ol. ricini arom.

MR. CORFIELD believes there are on the market preparations said to be suspensions of bismuth hydroxide, and it is possible to purchase bismuth hydroxide, though on examination it usually complies with all the requirements of bismuth carbonate. The paper will be useful to the manufacturer.

MR. KEALL paid tribute to the author for his work.

MR. HAYES asked if the tinctorial value had been looked at from the point of view of the patient, who would no doubt prefer the medicine to be good-looking.

MR. TREVES BROWN, in replying, said limits are being laid down for the purity of the dye solutions, as samples from different sources do differ, though this is not visible to the eye in dilution. If the pharmacopœia goes on demanding apparatus every pharmacy will eventually be equipped with a tintometer. (Laughter.) The oils referred to had been used on the modification of the original formula. The pasta. tragac. co. had been kept for eight months and was quite satisfactory so far. The reason for the use of ac. sulph, was that it was believed it would be removed more easily by calcium carbonate. The pasta. mag. sulph. had been kept for fifteen months. Glycerophates are being standardised. The red solution had been devised to the requirement of the Codex and it is distinctly superior to cochineal or cudbear. Aniline dyes in the proportion they will be present in medicine would not be likely to have a serious action. The more highly dried magnesium sulphate would require more water to crystallise than the less highly dried one.

The next paper, presented by the author, was:—

Changes in Acid Solutions of Adrenaline

By L. A. HADDOCK, B.Sc., F.I.C.

[ABSTRACT]

OWING to the discrepancies which have occasionally been found between the purity of adrenaline as measured by its specific rotation and by its biological assay, it was determined to investigate the changes which might occur in the optical activity of acid solutions of adrenaline. It was decided to investigate, first the effect of changes in PH in the acid range on the optical activity of solutions of *l*-adrenaline, followed by the effects produced by extraneous substances such as chlorbutol and sodium chloride. The specific rotations recorded were all measured at 16° C., and the D line of sodium was used. In the case of solutions of adrenaline exposed to visible light or sterilised at 80° C. a red or brown coloration was generally produced which did not permit further measurements being carried out. It was, however, found that sodium hydrosulphite, added to the solutions, removed this colour almost entirely. About 20 mgm. per 25 c.c. of solution were used, and the rotation was measured immediately afterwards. It was established that the addition of this substance did not affect the rotation of freshly prepared solutions of adrenaline, provided no considerable period of time elapsed between the addition and the measurement of the rotation.

A 4-per-cent. solution of *l*-adrenaline in 10-per-cent. hydrochloric acid was found to be completely racemised after twelve hours, so that weaker hydrochloric acid was used in the next determination. The solution used was the solution required by the B.P., 1932, for the determination of the specific rotation of adrenaline. The solution was protected from light; and a table shows the change in rotation with time. After 216 hours, the concentration of adrenaline in the above solution was measured, using the method of Barker, Eastland and Evers. It was found to be 3.5 per cent. From the rotation at zero hour the initial concentration of *l*-adrenaline ($[\alpha]_D$ −51.5°) was 3.9 per cent., so that after 216 hours 10 per cent. of the adrenaline had been destroyed by oxidation, and 58.5 per cent. had been racemised. A 1-per-cent. solution of adrenaline in weaker hydrochloric acid was then prepared, the PH of the solution being 1.4. The initial specific rotation was −50.0°, and after 451 hours in darkness the rotation had not changed. The addition of fifty parts per million of copper, or five parts per million of ferric iron to similar solutions produced no change in the specific rotations after 360 and 335 hours respectively. A similar solution was prepared in normal sodium chloride, but the specific rotation was again —50.0° after 284 hours. This latter solution was much more coloured than the others, and confirmed the statements that the chlorine ion tends to promote oxidation of adrenaline. From these results it is evident that racemisation is extremely slow in 1-per-cent. adrenaline solutions at PH 1.4 preserved from the action of light.

The action of light on 1-per-cent. solutions was then investigated, some of which contained chlorbutol. The light used was bright sunlight, filtered red light from a Wratten safety lamp, or the ultra-violet light transmitted by a wood screen. The results are set out in a table. It appears that racemisation is negligible under the conditions outlined above. The solutions exposed to ultra-violet light and red light remained colourless, while those exposed to sunlight became coloured. In the latter case the colour was usually pale brown except when chlorbutol or acetone were present. These caused a pink colour to develop fairly rapidly.

Several solutions were then sterilised at 80° C. for one hour according to the method of the Pharmacopœia. The small fall in rotation might be accounted for by oxidation of the adrenaline, since all the solutions became very coloured and needed decolorisation with sodium hydrosulphite before readings could be taken. Several samples of liquor adrenalinæ hydrochloridi B.P., 1932, were then submitted to all the above methods. The theoretical rotation of 200 mm. of this solution would be −0.1°. Owing to the difficulty of obtaining readings with an accuracy of less than 0.02°, the results can obviously be only roughly comparative. They do, however, show if any appreciable changes in rotation occur. A sample of the liquor (B.P., 1914) which had been kept in the dark for two and a half years was examined. It was brown in colour and contained some sediment. After filtration through an ordinary filter paper followed by treatment with sodium hydrosulphite the observed rotation of 200 mm. was −0.10°, showing that no appreciable fall in rotation had occurred. Samples exposed to ultra-violet light or red light remained colourless, while those exposed to sunlight were coloured pink. The irradiated liquor whose rotation had fallen to −0.02° was examined for adrenaline by the method of Barker, Eastland and Evers. The amount found was 0.1 per cent., showing that the irradiation by ultra-violet light had produced a true racemisation, leaving the adrenaline undestroyed. Further samples were sterilised at 80° C. for one hour according to the instructions of the B.P., 1932. The solutions were very coloured, and the fall in rotation is probably produced mainly by oxidation rather than by racemisation of the adrenaline.

SUMMARY

The above results show that racemisation of *l*-adrenaline is comparatively rapid in hydrochloric acid solutions at approximately PH 0.1, but that at higher PH values of 1.4—3.7 it becomes negligibly small. The changes produced by light are also small from a quantitative standpoint, and consist mainly in slight oxidation, racemisation being negligible. The total visible spectrum is more

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efficacious in this respect than either the ultra-violet spectrum alone, or pure red light, and the presence of substances such as chlorbutol assist the action of the light. Ultra-violet light, however, produces true racemisation in dilute solutions such as liquor adrenalinæ hydrochloridi, but not in stronger solutions. Sterilisation at 80° C. for one hour causes slight destruction of adrenaline, but the amount of racemisation seems negligibly small in both weak and strong solutions.

Discussion

The Chairman said the paper was a study of a type of problem of great practical importance.

Mr. Wokes said he was very interested in the apparent discrepancy of biological methods with chemical methods in the assay of adrenaline.

Mr. Evers said it seemed possible that racemisation might occur in B.P. solution of adrenaline. It was a relief that it did not do so.

Mr. Haddock replied.

The next paper, which was taken as read, was:—

Solution of Arsenious and Mercuric Iodides

By J. R. C. Bateson, B.Pharm., Ph.C.

[Abstract]

The experiments concern an attempt to determine the composition of the official solution of arsenious and mercuric iodides. Though this question has not been settled, certain facts of importance have been established. To ascertain whether arsenic entered into combination with mercury, arsenious iodide was dissolved in water to produce by hydrolysis a solution of hydriodic acid of known molar concentration. A solution of hydriodic acid of the same concentration was made by passing hydrogen sulphide into water containing iodine in suspension. Dilutions from each solution were shaken with mercuric iodide in excess until saturated and the mercuric iodide estimated gravimetrically as sulphide. The following results were obtained:—

(1) Solution of AsI_3			(2) Solution of HI		
Molar conc. HI = A	Molar conc. HgI_2 found = B	$\frac{x}{y}=\frac{A}{B}$	Molar conc. HI = A	Molar conc. HgI_2 found = B	$\frac{x}{y}=\frac{A}{B}$
0·1026	0·04968	2·06	0·10	0·0479	2·08
0·0683	0·0316	2·16	0·066	0·03038	2·17
0·0513	0·02334	2·198	0·05	0·02215	2·25
0·041	0·018	2·27	0·04	0·01758	2·27
0·0338	0·01524	2·21	0·033	0·0146	2·25
0·02565	0·0111	2·25	0·025	0·0110	2·27

These facts do not necessarily indicate the composition of the official solution since this is not saturated with respect to mercuric iodide.

The oxidation of arsenious acid to arsenic oxide by free iodine only proceeds to completion in neutral or alkaline solution, whereas Donovan's solution is strongly acid. A sample of Donovan's solution prepared from pure arsenious iodide showed no trace of free iodine after storage for twenty-three months in a partially filled white glass bottle closed with a cork. The arsenious arsenic (calculated as AsI_3) diminished from 0.99 per cent. in the fresh solution to 0.92 per cent. after thirteen weeks and 0.36 per cent. after twenty-three months. A point of importance in dispensing solutions of mercuric and potassium iodides is noted. Precipitation occurs within a few days with 0.1 per cent. solution of mercuric iodide if prepared with 0.075 per cent. potassium iodide in accordance with the supposed formation of the compound $HgI_2,2KI$. No precipitation occurred during two years in a solution of similar strength of mercuric iodide (0.1 per cent.) made with 0.1 per cent. of potassium iodide.

(To be concluded)

Presentation of Presidential Chair

Following the Science Session on Wednesday afternoon, the members proceeded to another hall in Grosvenor House, where a large gathering assembled to witness the presentation from Australia, with the aid of the long-distance telephone, of a presidential chair, made from several kinds of wood sent over by the Pharmaceutical Associations of Australia and New Zealand. The success of the ceremony was somewhat marred owing to atmospherics, which prevented the speeches made in Sydney being clearly heard in London, but it was stated that the reception in Australia was excellent.

The Rt. Hon. J. H. Thomas, Secretary of State for Dominion Affairs, who presided, declared that in the act they were performing that day they were doing something more than they could tell to cement the bonds of friendship between the British Commonwealth of nations.

Mr. A. R. Melhuish (president of the Society at the time the presentation of the chair was discussed) explained the circumstances in which the suggestion was made, and the steps taken to have it carried out. It was in 1930, he recalled, that he was sitting next to Mr. Kenny, the vice-president of the New South Wales Association, who was being entertained with others. One of the things they talked about was the hope of the Society in regard to its new headquarters. Mr. Kenny was very interested, and wondered whether there might not be some means of the Pharmaceutical Societies of Australasia being associated with it, and finally the idea emerged of the presidential chair. Mr. Kenny was responsible for the idea, and eventually Mr. Gray (a member of the New South Wales Council) was asked officially to place it before the Council of the British Society. He need hardly tell how that proposal was received. Later, during a search for a designer, Mr. Eric Sharpe was found, but before that the Society had received great assistance from Sir Granville Ryrie, the High Commissioner of Australia.

Mr. Philip Wheeler and Mr. A. H. Young, representatives of the pharmaceutical societies of Australia and the Pharmaceutical Society of New Zealand at the conference, respectively, having spoken briefly, Mr. Eric Sharpe gave a description of the woods of which the chair was composed, and also spoke of the design.

Mr. H. N. Linstead (secretary of the Pharmaceutical Society of Great Britain) next described over the wireless telephone the scene in Grosvenor House for the benefit of the Australian listeners. He referred especially to their old colleague and contributor to many conferences, Mr. Horace Finnemore, adding that Mrs. Finnemore was present in the hall where he was speaking. It was a hot summer afternoon in London, where 600 people had collected for that ceremony, and there were a dozen or so of their friends sitting round a table in Sydney in the small hours of a winter's morning, but their aims were identical. (Applause.)

Mr. C. L. Butchers (general secretary of the Pharmaceutical Association of Australia and New Zealand) then described the scene at Sydney. Unfortunately, said Mr. Butchers, New Zealand was not directly represented, but the president of the New Zealand Pharmaceutical Society (Mr. Edward Smith) sent his greetings and sincere good wishes. The remaining representative present was Mr. G. G. Jewkes (federal vice-president of the Pharmaceutical Service Guild), which had flourishing branches in every state of the Commonwealth.

The Rt. Hon. J. H. Thomas, again addressing the gathering, spoke of the close link that existed between the pharmacists of this country and the Dominions. No one could fail to be impressed by the beauty and utility of the woods of which the chair was composed, and the rich possibilities they had for decoration and art. It should have the effect of stimulating interest in Australian and New Zealand timber, which might be largely used in the new building the British Society intended to erect very shortly. (Laughter.) He was proud that it had fallen to his lot to discharge such a friendly act of

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Imperial sentiment, and the fact that he, from a chemist's errand boy, had become Dominions Secretary was the best evidence they could have of the conquest of democracy under the British flag. (Applause.)

MR. DAVID DUNN, Ph.C. (president of the Pharmaceutical Association of Australia and New Zealand), in presenting the chair, said it was stimulating to know that they were being brought into such close contact with the parent British organisation in this unique manner. There had always existed a strong bond of fellowship and kindred interests between the pharmacists of Great Britain and their *confrères* and colleagues in the Antipodes.

MR. F. C. BENNETT (scientific secretary, Pharmaceutical Association of Australia and New Zealand and director of the College of Pharmacy, Brisbane) said their example in maintaining the standard of pharmaceutical education and training at a level in keeping with modern requirements reminded pharmacists in the Dominions that they still looked to Britain for guidance.

THE PRESIDENT, in accepting the chair on behalf of the Society, said he appreciated the good wishes of those who had assisted in its presentation. That was a very proud moment for him, and he accepted the gift with the greatest pleasure and warmest appreciation. The link that had been forged would for all time strengthen the chain of fraternal feeling that had existed between pharmacy in Great Britain and Australia and New Zealand. That occasion was an historic one.

The president then took his seat in the chair, observing that he accepted it with the deepest gratitude and thanks. It would always have a most prominent place in the headquarters of British pharmacy. (Applause.)

MR. H. FINNEMORE (president, Section O (Pharmaceutical Science) Australasian Association for the Advancement of Science and Lecturer in Pharmacy at the University of Sydney) said he wished to express to Mr. Thomas the sincere appreciation and thanks of the pharmacists of every State in the Commonwealth and in the Dominion of New Zealand for presiding at this memorable ceremony.

MR. NEATHERCOAT, seconding, described the occasion as a red-letter day in the history of British pharmacy.

THE RT. HON. J. H. THOMAS briefly replied, bringing a memorable occasion to a close.

Closing Session

Election of Officers for 1934

As we go to press we learn that at the closing session on July 27 the following officers were elected for the ensuing year:—

Chairman.—C. H. Hampshire.

Vice-Presidents.—W. A. H. Naylor, J. F. Tocher, F. Ransom, E. H. Farr, E. Saville Peck, David Hooper, W. Kirkby, C. A. Hill, H. G. Greenish.

Vice-Chairmen.—F. W. Gamble, R. R. Bennett, D. Lloyd Howard, J. T. Humphrey, J. H. Franklin, H. Skinner.

Hon. Treasurer.—F. W. Crossley Holland.

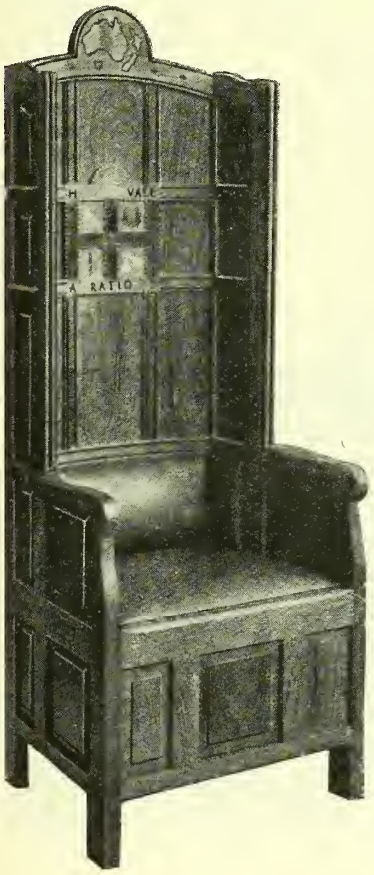
Hon. Secretaries.—C. E. Corfield, G. R. Boyes.

Other Members of the Executive.—H. Brindle, B. A. Bull, H. Deane, N. Evers, B. F. Howard, A. J. Jones; with T. Marns, A. R. Melhuish and P. F. Rowsell nominated by the Council of the Pharmaceutical Society.

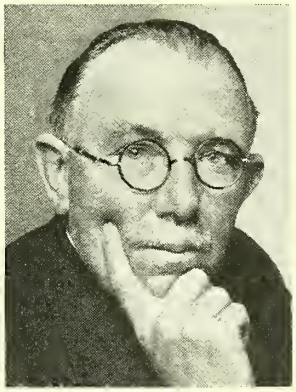
The above will be the officers of the Conference, together with the following *ex officio*:—

President.—The president of the Pharmaceutical Society of Great Britain.

Other Members of the Executive.—The president of the Pharmaceutical Society of Ireland, the president of the Pharmaceutical Society of Northern Ireland, the chairman of the North British Executive of the Pharmaceutical Society, the chairman of the Local Committee, the honorary local secretary.

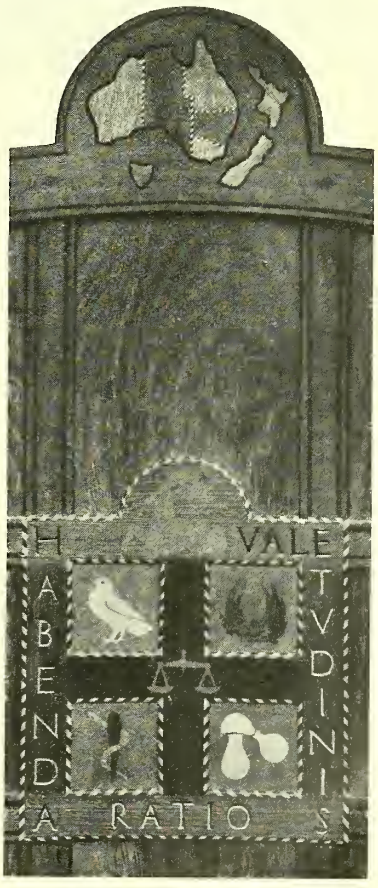


TWO VIEWS OF THE NEW PRESIDENTIAL CHAIR PRESENTED TO THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN ON JULY 26.



Photo] [Press Portrait Bureau

THE RT. HON. J. H. THOMAS, M.P., SECRETARY OF STATE FOR THE DOMINIONS



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Social Echoes

The reception given at Guildhall by the Corporation of the City of London will long remain in the memory of those who were present as an outstanding example of civic courtesy. The magnificence of the ancient building imparts dignity to any function that is held there ; and the stately procession of the Lord Mayor as it made its way up the Library to the dais was an impressive

Mr. H. M. Dugan (Aberdeen) and Mr. R. I. Edwards (President of the Pharmaceutical Society of Northern Ireland).

spectacle. Not only was the whole of the Guildhall, including the Art Gallery, thrown open, but the exhibits included a wonderful collection of charters, one of the very few known signatures of Shakespeare, and a superb array of gold and silver plate from the Mansion House. One of the manuscripts was open at a page containing a recipe for a prophylactic against plague sent by Henry VIII to the Lord Mayor in 1543. The treasures on view in the Art Gallery included the jewelled sceptre, the City purse, the famous pearl sword, and the sword presented by the Corporation to Lord Nelson in commemoration of the victory of the Nile. Among the distinguished visitors were the Belgian ambassador, several members of the medical profession, and pharmacists from overseas.

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The traditional and historical beauties of Guildhall were embellished on the opening night by a whisper of romance. As the evening wore on there were quiet rumours of an engagement of marriage that had just been entered upon between two well-known London members of the Conference. The interested parties, when confronted with these rumours, did not attempt to deny the soft impeachment, so that by the end of the evening Mr. Herbert Skinner and Miss Henrietta E. Claremont found themselves overwhelmed with congratulations and best wishes for their future welfare. Miss Claremont, herself a pharmacist, will be a fitting and charming counterpart to the versatile past-president of the Pharmaceutical Society and past-chairman of the Conference.

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Looking in at 17 Bloomsbury Square on Monday afternoon we found a pleasantly informal gathering sitting over the teacups in the examination hall. Great Britain, Northern Ireland and the Irish Free State were all represented, and this kindly thought on the part of the Pharmaceutical Society was a real boon to some of the early arrivals, who might otherwise have been "at a loose end" for a time.

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Tuesday morning will live in the memory of those fortunate enough to be included in the party that journeyed to Croydon. On arrival the party of nearly 150 was split up into groups. Report says that two pharmaceutical councillors were seen emerging from the air liner which made the last of the four flights. No doubt they went to steady the "flighty" in flight. The liners were very comfortable and the sensations during the flight not unpleasant. One passenger, who had never been in the air before, said she should certainly go to the Continent by air on the next visit. Flights lasted for about ten to fifteen minutes, covering 20 to 25 miles at an altitude of over 2,000 feet.

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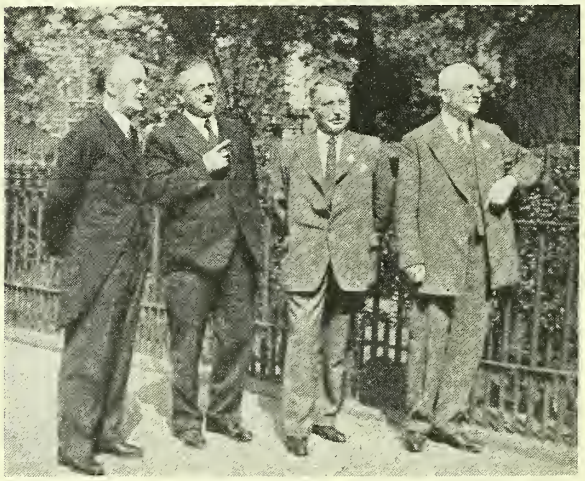
It would almost suffice, in recording the Conference banquet—the most successful in our experience, and we think, the most important ever held—to give a list of the guests at the chairman's table. Apart from the chairman himself, these were (reading from left to right):—Lieutenant-General Sir Harold Fawcus, Sir Holburt Waring, Professor L. N. G. Filon, Lord Trent, Lord Cozens-Hardy, Viscount Leverhulme, Lord Horder, Lord Askwith, Viscount Hailsham, Mrs. Keall, Mr. J. Keall, the Rt. Hon. Douglas Hacking, Mrs. Hampshire, Lord Macmillan, Sir Arthur Robinson, Dr. J. J. Hofman, the Earl of Halsbury, Surgeon Vice-Admiral Sir Reginald Bond, Viscount Bertie of Thame, Sir William Willcox, Sir Malcolm Delevingne, Dr. Edwin Deller, and Professor J. F. Thorpe.

* * * *

Toasts to "His Majesty the King" and to "Her Majesty the Queen, His Royal Highness the Prince of



Left to right: Mr. P. Brooke Kelly, Mr. John Keall, Mr. V. Van Itallie and Dr. J. J. Hofman

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Wales, and other members of the Royal Family " were proposed by the chairman, who shortly afterwards called on the Right Hon. Douglas Hacking, Parliamentary Under-Secretary for the Home Department, to propose " The Pharmaceutical Society." Mr. Hacking said he could not tell what chemists thought about him regarding the Pharmacy and Poisons Bill. He hoped that everyone understood it. (Laughter.) He had noticed that Mr. Glyn-Jones, a barrister, had written a book to explain it. If the Act does not appeal to all pharmacists it had found employment for one. (Laughter.) He did not know whether to praise it. Compulsory membership would result in self-government on similar lines to the General Medical Council. As to Part 2 of the Act it has emerged in a very satisfactory condition, and he was delighted (on behalf of the Home Office) that such measures of agreement had been achieved. Arrangements for the constitution of the Poisons Board were well in hand. Relations of the Society with the Home Office would be closer than in the past. In 1920 the Society showed hostility to the D.D.A., but this attitude had passed away, which augurs well for the future, and he paid tributes to the parts played by the president, past-presidents and secretary. He congratulated the Society on its ninetieth birthday. In conclusion, he said " May the best year of the past be the worst year of the future."

* * * *

Mr. Keall, responding, said chemists were under a debt to Mr. Hacking for the manner in which he had piloted the Bill. He was glad that differences of opinion had been overcome and the Act passed in a form acceptable to the Government, and the Society will take its part and contribute freely of its special knowledge in operating the Act. It was too much to hope that there was smooth water ahead, but the Society's representatives of the Poisons Board would be animated by no sectional interests, but would do what was best in the interest of the public. The next toast was that of " The British Pharmaceutical Conference," which was proposed by Professor J. F. Thorpe, D.Sc., F.R.S. The Conference is carrying out research work of the highest merit, said Professor Thorpe, and we are on the verge of wonderful discoveries. He could visualise the time when health and disease would be a matter of adjustment of auxiliary factors.

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Dr. Hampshire, in a brief and eloquent response, said that the Conference seemed to be endowed with the quality of perpetual youth. He made no apology for stressing the fact that the important part of the work of this Conference is the cultivation of pharmaceutical science. We may claim, he thought, that the work done by the Conference in the cause of pharmacy is an achievement of which any body of people may be justifiably proud. It is on the ground of scientific achievement that the Conference must base its claims to laurels, and it is in the continuance of scientific effort that the possibility of the future success of the Conference lies. The work done for the most part was of a practical type. One had heard that at one of our ancient universities there used to be a toast in some such terms as these: " To Mathematics: may they never be any use to anybody." The need for research in all departments of scientific work was greater now than ever before. The rewards of the research worker were great, probably not always material rewards, but the reward of the satisfaction that comes from the knowledge of labour well done and from successful accomplishment. He liked to think of the Conference also as an interlude, all too short, when we get away from the demands of personal affairs and try to contribute something to the common good.

Lady Visitors leaving the Society's Headquarters

Prominent Women Pharmacists

* * * *

" Our Guests " was submitted by Lord Leverhulme, who, in his opening remarks, said he particularly valued the compliment paid him as exactly ten years ago his father had proposed the corresponding toast at the London Conference. The conference idea, he said, had grown more than any other during this period. Was it to be wondered at that, as the morning after the night before, the Conference of pharmacists should be the final one of a series which had been held recently? He hoped the pharmacists would provide the pick-me-up. In conclusion he welcomed representatives of the Government, the Services, the medical profession, the Dominions and visitors from foreign countries. Dr. J. J. Hofman, president of the International Pharmaceutical Federation, who spoke in reply, urged the need for unity among pharmacists, and paid tribute to his hosts for the reception which had been accorded those present. Because England was separated from other countries by a stretch of water, English people seemed to take special care to welcome visitors from abroad.

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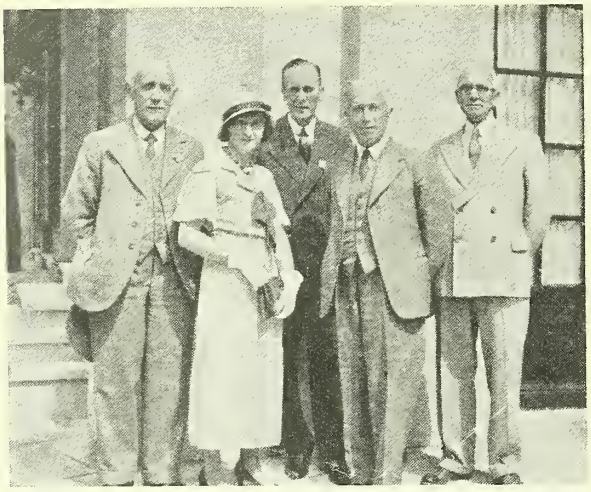
A popular Wednesday excursion was guided by Mrs. Mortimer through the Inns of Court and the Law Courts. This was unanimously acclaimed by the large party that took part in it as a fitting counterpart to the evening spent at the Guildhall. The Zoo excursion was but sparsely attended, but a good many inspected Cadby Hall



Mr. J. E. Connor (Northern Ireland), Mr. and Mrs. J. Reid (South Africa), Mr. M. L. Daniels and Mr. Peter Irvine.

and the marvellous intricacies of the Lyons catering organisation. Liberty's likewise came in for a fair share of attention from devotees of art in furniture, furnishing materials and dress fabrics. All tastes were catered for, thus demonstrating the catholicity of enterprise on the part of the efficient Ladies' Committee.

* * *

The success of Dr. C. H. Hampshire as chairman has been the subject of frequent remark during the week. We take this opportunity of placing on record the salient facts of his career—one of which pharmacy may legitimately be proud. He was educated at Ilkley Grammar School, and was apprenticed to the late Mr. A. Duckworth, Ph.C., of the same town. In 1905 he gained a Jacob Bell scholarship and entered the Pharmaceutical Society's School of Pharmacy, where he gained, in 1906 and 1907, numerous medals and certificates. After qualifying as a pharmaceutical chemist he served for a time on the teaching staff of the School, and engaged in research work under the direction of the late Professor A. W. Crossley. In 1910 he graduated Bachelor of Science in the University of London with first-class honours in chemistry; in 1911 he passed the examinations for the Associateship of the Institute of Chemistry and was later admitted to the Fellowship.

* * * *

In 1914 he was appointed pharmacist to University College Hospital, London, an appointment which he held for fifteen years. During this time, by special permission of the hospital authorities, he took the medical courses and in 1925 he gained the M.R.C.S. and L.R.C.P. diplomas, following this up in 1927 by taking the M.B., B.S. degrees in the University of London. While at University College Hospital he found time to act for a time as secretary of the Western Pharmacists' Association; he was a member of the Committee of Revision of the British Pharmaceutical Codex, 1923, and afterwards of the Science Committee of the Pharmaceutical Society. His connection with the Conference dates from 1913 when he was elected a member of the Executive Committee; in 1919 he became junior secretary of the Conference and in 1923 senior secretary. In 1929 he retired from the secretaryship. While junior secretary he acted as general editor of the "Year-Book of Pharmacy"; when, in 1928, the Year-Book was reconstituted as the annual volume of the "Quarterly Journal of Pharmacy and Allied Sciences," he was appointed editor, and he remains editor of this journal under its new name.

* * * *

In 1929 Dr. Hampshire was appointed secretary to the newly formed Pharmacopœia Commission which has produced the British Pharmacopœia, 1932. His research work includes various papers (in collaboration with others) in the "Journal of the Chemical Society." He is best known, perhaps, as the author of a manual on "Volumetric Analysis" for students of pharmaceutical and general chemistry. Dr. Hampshire is a Fellow of the Royal Society of Medicine, and a member of the Galen Lodge and of the Beaudesert Royal Arch Chapter. In the meetings of the Science Section he revealed, as his friends expected, a remarkable grasp of the salient points of each paper presented.

* * * *

The work of the president on these occasions is differentiated from that of the chairman by subtle gradations the mysteries of which we do not pretend to be able to fathom. Whatever may be the scope of his duties in theory, Mr. Keall has proved to be exactly the right man for his office as president of the Conference, and especially of a Conference meeting in London. His geniality and accessibility have endeared him to everyone, and in particular to those provincial visitors who usually find Londoners a little distant and off-handed. With Mrs. Keall as a gracious seconder of the president, the social events have gone with an *élan* that leaves nothing to be desired.

* * * *

The Executive Committee were wisely inspired in their selection of Grosvenor House as the Conference headquarters. With Hyde Park and Kensington Gardens on one side of the building, an ample supply of fresh air was available, mitigating the effect of the heat; and the amenities of the spacious restaurant afforded ample scope for the sub-conferences of the little groups that foregather on these occasions. The organisation of the banquet was as perfect as anything human can be, its punctuality of commencement being a welcome feature. Without hesitation it may be added that the list of visitors representing the Government, the learned professions and commerce was the most distinguished that has ever graced a Conference dinner. All the members of the Executive and its subcommittees must share in this general tribute.

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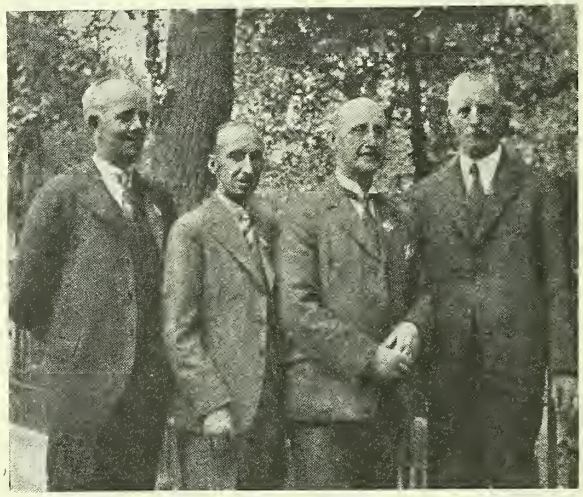
As in most of the years since 1906, it is through the energy of Mr. John Cleworth that we are able to illustrate this section.



Mr. R. I. Edwards (President of the Pharmaceutical Society of Northern Ireland) with three colleagues.

Trade Report

Where possible scales of prices of chemicals are given for bulk down to small quantities. Prices recorded for crude drugs, essential and fixed oils and coal tar products are for fair sized wholesale quantities. Qualities of chemicals, drugs, essential and fixed oils, etc., vary, and selected brands or grades would be at higher values

28 Essex Street, W.C.2, July 27

WHILE there is in most markets a fairly strong undertone there is at the same time some nervousness, chiefly concerned with currency fluctuations. Business has been rather patchy, a good day following a slack one, but on the whole fairly satisfactory. The volume would no doubt have been greater had conditions been more settled. The American dollar has swung back this week and there seems to be an effort to restrict fluctuations. In the pharmaceutical chemicals markets business has been well up to average, and here prices are showing but little variation ; there is some price-cutting, but not more than usual. Makers notify a substantial reduction in rochelle salt prices. The crude drugs markets have shown a little more life in some instances, and some dearer quotations are noted. Agar is dull and slightly easier forward. Jamaican and West African ginger are dearer. Hydrastis shows a sharp advance for shipment. Pimento is dearer. Senega is again quoted at higher figures. Tragacanth has been in better demand, the market continuing firm. Jamaican honey is in fair demand for the time of year, with the market firm. In the essential oils markets a feature has been the reports of stronger shipment markets for French oils, particularly lavender. Californian orange is dearer, while the lemon is so far unchanged. Bergamot is steadier for shipment. Java and Ceylon citronella have been dull all the week. Lemongrass is again dearer with shipment offers restricted. Japanese peppermint is dull but steady, while the American natural oil is firm and offered sparingly for shipment. Wormseed shows a slight recovery and is steadier. The products in the fixed oils markets have had a fairly good week, with prices keeping steady and business on a moderate scale. Linseed oil is slightly better after the recent decline. American turpentine is still losing ground with business dull. In the coal-tar group the demand for the better grades of cresylic acid has been really good and creosote oil has been in more request. Carbolic acid crystals are steady.

Exchange Rates on London

THE following is a list of the chief Continental and other exchange rates at the opening on Thursday morning:—

Centre	Quoted	Par	July 27	Value of the £
Amsterdam ...	Fl. to £	12·107	8·27½	13/8
Berlin	Mks. to £	20·43	13·99½	13/8½
Brussels ...	Belgas to £	35	23·93	13/8
Copenhagen ...	Kr. to £	18·159	22·40	24/8
Lisbon	Esc. to £	110	110	20/–
Madrid ...	Ptas. to £	25·22½	39⅛	31/8¼
Milan	Lire to £	92·46	63⅛	13/8½
Montreal ...	Dol. to £	4·86⅔	4·91½	20/2½
New York ...	Dol. to £	nominal	4·62½	18/11¾
Oslo	Kr. to £	18·159	19·90	21/11
Paris	Fr. to £	124·21	85⅛	13/9
Prague ...	Kr. to £	164·25	112¾	13/8¾
Stockholm ...	Kr. to £	18·159	19·37½	21/4
Warsaw ...	Zloty to £	43·38	30	13/11½
Zurich	Fr. to £	25·2215	17·30	13/8

Bank rate 2 per cent.

Pharmaceutical Chemicals, etc.

BUSINESS has been fairly satisfactory in most products and sales prices are keeping quite steady. Rochelle salts are quoted at cheaper prices.

ACETANILID.—Market remains quiet ; quoted unchanged: B.P. crystals and powder, 1s. 5½d. to 1s. 8d. per lb., as to quantity.

AMIDOL.—Prices are holding, with business on a limited scale: 56 lb., 7s. 3d.; 28 lb., 7s. 6d.; 14 lb., 7s. 11d. per lb., in 7-lb. tins, and higher prices for smaller quantities.

AMIDOPYRIN.—Business is mostly for spot material in small lots ; forward is rather dearer on exchange: crystals, five cwt., 18s. 3d.; two cwt., 18s. 9d.; less than two cwt., 19s. 9d. per lb.; with powder 2¼d. per lb. extra.

AMMONIUM BENZOATE.—The market is keeping steady at about 3s. 4d to 3s. 6d. per lb., as to quantity ; business quiet.

AMMONIUM ICHTHOSULPHONATE.—Prices are quoted unchanged ; business slow: one cwt., 1s. 6½d., in 14-lb. tins ; 1s. 8d., in 1-lb tins ; 1s. 10d., in 8-oz. tins; and 2s., per lb., in 4-oz. tins.

ASPIRIN.—Makers' and dealers' quoted prices are maintained ; inquiry has been rather quieter this week: home trade, ten cwt., 2s. 9d.; five cwt., 2s. 10d.; one cwt., 2s. 10½d.; 28 lb., 2s. 11d.; 14 lb., 3s.; 7 lb., 3s. 2d. per lb. Export to Colonies and British Possessions: ten cwt., 2s. 9d.; five cwt., 2s. 10d.; one cwt., 2s. 10½d. per lb., f.o.b.; less than one cwt., 2s. 11d. per lb., ex works.

BARBITONE.—Spot offers are fairly steady, market dull ; rather dearer forward: spot, one cwt., 13s.; 56 lb., 13s. 2d.; 14 lb., 13s. 5d.; small parcels, up to 14s. per lb.

BENZOIC ACID (B.P.).—A fair inquiry is being received ; market steady: quantities, ex works, 1s. 9½d.; spot parcels, 1s. 10d. to 2s. 2d. per lb., ex store, as to quantity.

BISMUTH SALTS.—Makers' scales of sales prices for these salts continue at former rates.

BROMIDES.—Makers' and dealers' prices are unchanged ; inquiry is only moderate: ammonium, not less than five cwt., 1s. 9d.; one cwt., 1s. 10d.; 28 lb., 2s. 1d.; smaller quantities, 2s. 5d. per lb.; potassium B.P. crystals and granular, not less than five cwt., 1s. 6d.; one cwt., 1s. 7d.; 28 lb., 1s. 10d.; smaller quantities, 2s. 2d. per lb.; sodium B.P., not less than five cwt., 1s. 8d.; one cwt., 1s. 9d.; 28 lb., 2s.; smaller quantities, 2s. 4d. per lb. net, without engagement. Special prices for larger quantities.

BUTYL CHLORAL HYDRATE.—Market is about steady ; business slow: spot, 14 lb., 8s.; 7 lb., 8s. 3d.; 1 lb., 8s. 6d. per lb., in 1-lb. bottles.

CAFFEINE.—A moderate business is being done at keen prices: pure alkaloid, 5s. to 5s. 3d. per lb.; citrate, 4s. 3d. to 4s. 6d. per lb., as to quantity.

CALCIUM LACTATE.—Business is rather quiet, with the market competitive: spot, one cwt., 1s. 0¾d.; 56 lb., 1s. 1¼d.; 28 lb., 1s. 2½d.; smaller quantities, up to 1s. 6d. per lb.

CHLORAL HYDRATE.—Makers' prices for home trade are steady: duty-paid crystals, in 14-lb. free containers, five cwt., 3s. 4d.; one cwt., 3s. 5d.; 56 lb., 3s. 6d.; 28 lb., 3s. 7d.; 14 lb., 3s. 8d. per lb.; 28-lb. jars, one penny per lb. extra.

CHLOROFORM.—Home trade prices quoted by makers are steady: in drums, 2s. 3d. to 2s. 6d.; winchesters, 2s. 3½d. to 2s. 6½d.; 2-lb. bottles, 2s. 4½d. to 2s. 7½d.; 1-lb. bottles, 2s. 5½d. to 2s. 8½d.; 8-oz. bottles, 2s. 6½d. to 2s. 9½d.; 4-oz. bottles, 2s. 8½d. to 2s. 11d., for 10 cwt. down to 56-lb. lots; carriage paid on minimum cwt. lots.

CITRIC ACID (B.P. CRYSTALS).—Makers' quoted price for home trade is unchanged at 9½d. per lb., less 5 per cent. discount, nominal and without engagement. A very fair volume of business is being done. Dealers are offering at competitive prices.

CREAM OF TARTAR.—Business is sustained on a fair scale. The home trade quoted price for 99 to 100 per cent. material is unchanged at 80s. per cwt., less 2½ per cent. discount, nominal and without engagement. Dealers are quoting at about competitive prices.

CREOSOTE (B.P.).—Spot bulk supplies are being quoted from 1s. 10d. per lb. in 25-kilo. demijohns ; smaller parcels, up to 2s. 2d. per lb. Business is unimportant.

CREOSOTE CARBONATE.—Dealers' spot prices vary from about 8s. 4d. up to 10s. per lb., as to quantity.

GUAIACOL CARBONATE.—Dealers' spot values are fairly steady and rather dearer forward. Spot, one cwt., 9s. 1d.; 56 lb., 9s. 1½d.; 28 lb., 9s. 3d.; smaller quantities, up to 9s. 6d. per lb.

HEXAMINE.—British material is quoted at former rates and business is fairly satisfactory: ten cwt., 1s. 9d.; five cwt., 1s. 9½d.; two cwt., 1s. 10d.; one cwt., 1s. 10½d.; 56 lb., 1s. 11d.; 28 lb., 1s. 11½d.; 14 lb., 2s.; 7 lb., 2s. 0½d. per lb. British rough powder is quoted from 1s. 5d. to 1s. 6½d. per lb., as to quantity. Foreign material to come forward is not competitive.

HYDROQUINONE.—A fair spot business is reported, with quoted prices maintained ; some occasional cheaper offers: ten cwt., 5s. 7½d.; five cwt., 5s. 8½d.; two cwt., 5s. 9d.; one cwt., 5s. 9½d.; 56 lb., 5s. 10½d.; 28 lb., 6s.; 14 lb., 6s. 2d.; 7 lb., 6s. 6d. per lb., carriage paid.

IODIDES.—Makers' scales of prices for these salts continue at former figures.

LACTIC ACID (B.P.).—Rather more inquiry, with keen prices quoted for big parcels: quantities in carboys, 1s. 4½d. to 1s. 5d.; in winchesters and bottles, 1s. 7d. to 1s. 10d. per lb., as to quantity.

METHYL SALICYLATE (B.P.).—This market is still dull; makers' and dealers' quoted prices are unchanged: one ton and over, 1s. 4½d.; ten cwt., 1s. 5d.; five cwt., 1s. 5½d.; one cwt., 1s. 6d.; less than one cwt., 1s. 6½d.; small quantities in bottles, up to 2s. per lb.

METHYL SULPHONAL.—Business on spot is of small account; forward dearer on exchange rates: spot, two cwt., 19s. 9d.; one cwt., 20s. 4½d.; 56 lb., 21s.; small parcels, 21s. 9d. per lb.

METOL.—A fair business in small lots; home trade prices steady: 56 lb., 9s. 3d.; 28 lb., 9s. 6d.; 14 lb., 9s. 9d.; 7 lb., 10s. 9d. per lb., in 7-lb. tins, bottles extra. Wholesale distributors' prices for smaller quantities at higher prices.

MILK SUGAR.—Some inquiry is being received; prices are steadier: one ton, 52s.; ten cwt., 53s.; two cwt., 54s. per cwt., in two-cwt. cases.

PARALDEHYDE.—Prices continue steady at recently revised rates: one demijohn, 1s. 1d.; 36 winchesters, 1s. 4½d.; 12 winchesters, 1s. 5d.; six winchesters, 1s. 7d.; one winchester, 1s. 10d. per lb., cases included.

PHENACETIN.—A fair inquiry is being received and the recent cheaper offers are not so much in evidence; business limited: crystals or powder, ten cwt., 4s. 1½d.; five cwt., 4s. 3d.; two cwt., 4s. 4½d.; 56 lb., 4s. 6d.; less than 56 lb., 4s. 9d. per lb., carriage paid on minimum cwt. lots. No falling clause on contracts over twelve months.

PHENAZONE.—Market is rather quiet, and prices are being discounted in some quarters: crystals, ten cwt., 9s. 10d.; five cwt., 10s.; two cwt., 10s. 3d.; and less, 11s. per lb.; with powder, 2¼d. per lb. extra.

PHENOLPHTHALEIN.—Makers' agreed prices are steadily maintained; business limited: two cwt., 4s. 7d.; one cwt., 4s. 8d.; 28 lb., 4s. 11d.; 14 lb., 5s. 2d.; 7 lb., 5s. 5d.; smaller parcels, up to 5s. 8d. per lb.

PHENYL ETHYL BARBITURIC.—The market continues very irregular, with former rates at a considerable discount in most quarters.

POTASSIUM PERMANGANATE (B.P.).—Market is steady at dealers' prices; business normal in small spot parcels: quantities in two-cwt. drums, 8½d. to 8¾d.; druggists' parcels, 9d. to 10d. per lb., as to quantity.

POTASSIUM SULPHOGUAIACOLATE.—Dealers are quoting from 5s. 9d. to 6s. per lb., as to quantity. Business is slow.

QUININE SALTS.—Convention prices are very steady as quoted, on current exchange rates: sulphate, 1s. 10d.; bisulphate, 1s. 10d.; ethyl carbonate, 2s. 4¾d.; salicylate, 2s. 5½d.; phosphate, 2s. 10d.; hydrochloride, 2s. 3¾d.; bihydrochloride, 2s. 6½d.; hydrobromide, 2s. 3¾d.; bihydrobromide, 2s. 6¾d. per oz., carriage paid on bulk quantities.

RESORCIN.—Home makers' quoted prices are unchanged: crystals, one cwt., 4s. 11d.; 56 lb., 5s.; 28 lb., 5s. 1d.; 14 lb., 5s. 3d.; 7 lb., 5s. 6d.; less than 7 lb., 6s. per lb. Small spot parcels of foreign, firm at 5s. 8d. to 6s. per lb.

ROCHELLE SALTS.—Makers notify the following reductions: powder, five cwt. and over, 67s. 6d.; one cwt., 70s.; less than one cwt., 72s. 6d. per cwt.; with crystals, 2s. 6d. per cwt. extra. PULV. SEIDLITZ, five cwt. and over, 55s.; one cwt., 56s. 9d.; less than one cwt., 58s. 9d.; double salts, five cwt. and over, 60s. 6d.; one cwt., 62s. 9d.; less than one cwt., 64s. 9d. per cwt., casks free, carriage paid on minimum cwt. lots. Quoted without engagement. Previous price alteration on May 1, 1933.

SACCHARIN.—Convention prices are steady: 550, 1 lb., 37s. 6d. per lb., duty-paid, with rebates for quantities.

SALICYLIC ACID (B.P.).—Makers' prices for home trade are steady; market dull: one ton, 1s. 7d.; ten cwt., 1s. 7½d.; five cwt., 1s. 8d.; one cwt., 1s. 8½d.; 28 lb., 1s. 9d.; 14 lb., 1s. 10d.; 7 lb., 2s. per lb.

SALOL.—Business is slow, with some offers at cheaper prices: spot, crystals, two cwt., 5s. 9d.; one cwt., 5s. 11d.; 56 lb., 6s.; smaller parcels, 6s. 3d. per lb.; powder, 2d. per lb. extra.

SANTONIN.—There is no news as to any revision of the scale of sales prices and it is understood the matter is still under consideration.

SODIUM BENZOATE (B.P.).—Inquiry continues on a fair scale. One-cwt. lots of B.P. 1932 quality at 1s. 7d.; small parcels, up to 1s. 10d. per lb., as to quantity.

SODIUM DIETHYLBARBITURATE.—Makers' prices are very steady; business limited: spot, one cwt., 13s. 9d.; 56 lb., 14s.; 28 lb., 14s. 3d.; 14 lb., 14s. 6d.; 7 lb., 14s. 9d.; smaller parcels, up to 15s. per lb.

SODIUM SALICYLATE (B.P.).—Makers' and dealers' quoted prices are maintained; market is very quiet: home trade, powder, two tons, 2s.; one ton, 2s. 0½d.; ten cwt., 2s. 1d.; five cwt., 2s. 2d.; one cwt., 2s. 3d.; 28 lb., 2s. 4d.; 14 lb., 2s. 6d.; 7 lb., 2s. 7d.; 1 lb., 2s. 8d. per lb.; with crystals one penny per lb. extra.

SULPHONAL.—Spot prices are steady and dealers' quotations for forward delivery are rather dearer on current exchange rates: crystals: two cwt., 15s. 9d.; one cwt., 16s. 4½d.; 56 lb., 16s. 9d.; smaller parcels, up to 18s. per lb.; with powder, 2d. per lb. extra.

TARTARIC ACID (B.P. CRYSTALS).—The home trade price quoted by makers continues at 11¾d. per lb., less 5 per cent. discount, nominal and without engagement. Business continues on a satisfactory scale. Dealers are quoting at competitive prices.

THEOBROMINE.—The market continues very competitive; inquiry is limited: pure alkaloid, 5s. to 5s. 6d. per lb.; sodium salicylate, 4s. 10d. to 5s. 3d. per lb., as to quantity.

THYMOL.—No further change in prices for synthetic fine white, but some offers are cheaper: synthetic, fine white, one cwt., 5s. 1½d.; 56 lb., 5s. 3d.; 28 lb., 5s. 4½d.; 14 lb., 5s. 6d. per lb.; ex ajowan seed, one cwt., 7s. 3d.; 56 lb., 7s. 4½d.; 28 lb., 7s. 6d.; 14 lb., 7s. 9d. per lb.

VANILLIN.—Rather more inquiry is being received, with not much material offering at cheap figures: 100 per cent., one ton, 14s. 3d.; ten cwt., 14s. 6d.; five cwt., 14s. 9d.; three cwt., 15s.; one cwt., 15s. 3d.; 56 lb., 15s. 6d.; 28 lb., 15s. 9d.; 14 lb., 16s.; less, 16s. 3d. per lb.

Crude Drugs, etc.

AGAR.—The spot market is dull and unchanged; forward is quoted cheaper with no interest: spot, Kobe, No. 1, 2s.; No. 2, 1s. 10½d.; Yokohama, No. 1, 1s. 10½d. per lb.; shipment, Kobe, No. 1, 1s. 9d.; No. 2, 1s. 7½d.; Yokohama, No. 1, 1s. 7d. per lb., c.i.f.

ANTIMONY.—Values are unchanged, market steady. Chinese crude, spot, nominal; shipment, £19; Chinese oxide, spot, £28; shipment, £25, c.i.f.

BALSAMS.—The spot price for *Tolu* is again cheaper at about 3s. 2d. to 3s. 3d. *Canada* is steady at 2s. 9d. per lb. *Capivi* continues scarce and firm at 1s. 9d. per lb.

BELLADONNA.—Good test root on spot would be about 65s. to 66s. per cwt. and lower quality at cheaper rates. The market is fully steady but quiet. Leaves are offered at 65s. per cwt.

BISMUTH.—The price of the metal continues at the advance recorded last week of 4s. 9d. per lb.

BUCHU.—Rather easier on a slow market with prices for all grades on a slightly cheaper level. Good green rounds, about 1s.; yellowish to fair, 9d. to 11d.; ovals are quoted from 7d. to 8d. per lb., as to quality.

BURDOCK ROOT.—Dealers are quoting spot root at about 45s. per cwt.

CAMPHOR.—There is very little interest in this market; spot and forward quoted unchanged: spot, slabs, 2s. 2d.; flowers, 2s. 3d.; tablets, 2s. 7d. per lb.; shipment, slabs, 1s. 9½d.; flowers, 1s. 10¼d.; tablets, 2s. 1¼d. per lb., c.i.f. English refined is quoted unchanged: flowers, one cwt., 3s. 1d.; 28 lb., 3s. 2d.; small lots, 3s. 3d. per lb. Transparent tablets, 4 oz., 8 oz., and 16 oz., 3s. 4d.; 1 oz. and 2 oz., 3s. 5d.; ½ oz., ¼ oz. and ¼ oz., 3s. 6d. per lb.; special prices for contracts for quantities.

CARDAMOMS.—The market continues fully steady, with supplies restricted. Mysore, No. 1, bold, from 5s. to 5s. 3d.; medium, 3s. 3d. to 3s. 4d.; small, 1s. 10d. to 2s. 4d. per lb. Splits from 1s. 8d. to 3s. per lb., as to size.

CASCARA SAGRADA.—The shipment quotation for this year's peel is steady at 35s. per cwt., c.i.f., duty paid, in minimum car-load lots, and business has been sustained: spot, 1932 peel, 62s. 6d.; 1931 peel, 65s. per cwt.

CHAMOMILES.—The crop is likely to be of good quality and prices are expected to be at about 110s. per cwt., c.i.f. Samples of new flowers are due to arrive next week.

CLOVES.—The market is quoted a point lower on the week and remains quiet. Zanzibar, 5¼d. per lb.; shipment, August-October, 5d.; October-December, 5d. per lb., c.i.f.

The landings of Zanzibar in London during the week ended July 15 were 7 and the deliveries 43, leaving a stock of 1,310. From January 1 to date, landings of Zanzibar have been 2,365 and the deliveries 2,525. Landings of Madagascar for the week ended July 15 were *nil*, and the deliveries 5, leaving a stock of 1,052. Landings of Madagascar this year to date have been *nil* and the deliveries 104.

COCOA BUTTER.—Market is rather quiet and unchanged. Prime English, from 9½d. to 10d. per lb., as to quantity.

COCONUT (DESICCATED).—Business has been restricted; values are quoted unchanged. Spot, fine, 19s. 6d.; medium,

19s.; shipment, halves, August, 17s. 9d.; September, 18s. per cwt., c.i.f.

COD-LIVER OIL.—The Norwegian shipment market continues steady with some business reported. Finest Lofoten steam refined non-freezing medicinal oil, 108s. to 110s. per barrel, c.i.f. Spot is at about 142s. 6d. per barrel, ex store, duty paid. Some brands may be slightly cheaper. Newfoundland medicinal quality is quoted at 132s. 6d. per barrel, ex store.

COLCHICUM SEEDS.—The quotation for new crop seed to arrive is at about 2s. per lb.

CROTON SEED.—Offers for shipment continue steady at 75s. per cwt., c.i.f.

DAMIANA LEAVES.—Dealers are offering spot supplies at about 1s. per lb.

ERGOT.—Quotations for new crop Spanish are being received at 1s. 5d. per lb., c.i.f. Market is steady. Russian is offering on spot in the region of 1s. per lb.

FENNEL SEEDS.—Some spot supplies are being quoted at about 24s. 6d. per cwt.

GELATIN.—Dealers report fair business, with their prices steadily maintained; spot, French, gold leaf, 1s. 8d.; silver leaf, 1s. 6d.; bronze leaf, 1s. 4½d.; German, thin leaf, 1s. 8d. per lb., in cwt. lots.

GENTIAN.—Supplies continue very scarce; there is no cut or sliced root available.

GINGER.—The market has improved, with West African now steady at 21s. 6d. per cwt. Jamaican is also dearer, with more business moving. Spot is quoted from 70s. to 110s. per cwt.

GUM ACACIA.—This market seems to be rather neglected; values are about unchanged; spot, Kordofan cleaned sorts, 35s.; bleached, 70s. per cwt.; shipment, Kordofan cleaned sorts, 32s.; natural, 31s. per cwt., c.i.f.

HALIBUT OIL.—Dealers are offering forward at 9s. per kilo. for 220/250 blue units; inquiry is satisfactory.

HENNA LEAVES.—There has been a steady demand this week, with sales at previous rates.

HONEY.—Inquiry is sustained following on the brisk demand at last week's auctions, with the generally higher prices then obtained fully held. Jamaican, set pale amber to pale, 42s. to 47s. 6d.; set amber to palish amber, 35s. to 37s.; set darkish to dark amber, 31s. to 32s. 6d.; liquid pale, 47s.; liquid amber, 35s.; liquid very dark to dark amber, 30s. to 32s. St. Lucia, liquid dark, in tins, at 32s. per cwt.

HYDRASTIS.—This market is definitely dearer. Shipment offers are firm at 4s. 6d. per lb., c.i.f., which would make spot fully 5s. per lb., but there may be spot holders willing to take less.

IPECACUANHA.—This market is attracting very little attention and prices are barely steady. Matto Grosso, about 4s. 9d. to 4s. 10d. per lb., as to quantity.

MANNA.—Dealers are offering selected flake in 1-lb. tins at about 3s. 9d. per lb.

MENTHOL.—This market is having a bad time, with very little inquiry about. K/S brands, spot, 13s. 9d. and less for bulk quantities; shipment is slightly cheaper and steady, but business is lacking; July-August, 12s. 1½d.; October-December, 12s. per lb., c.i.f.

MERCURY.—A moderate business is reported, with previous rates unchanged. Spot, £9 2s. 6d. to £9 10s. per bottle. Shipment, about £9 per bottle, f.o.b. Continent, as to quantity.

OPIUM.—A little more interest shown here, with the market unchanged. Shipment continues to be prohibited. Quoted about 1s. 1d. per unit, landed and duty paid.

PEPPER.—Business has been a little better and the market is steady, as quoted. Lampong, spot, 5¼d.; shipment, August-October, 4 1/16d.; October-December, 4¼d. per lb., c.i.f. Tellicherry, spot, 5½d.; shipment, August-September, 5½d.; Aleppy, spot, 5¼d.; shipment, August-September, 48s. 6d. per cwt., c.i.f. White Muntok, spot, 7⅝d.; shipment, August-October, 6⅝d.; October-December, 6¾d. per lb., c.i.f.

PIMENTO.—Prices on spot and forward have advanced, market steady. Spot, 3¼d. per lb.; shipment, August-September, 27s. 6d.; September, 28s. per cwt., c.i.f.

RHUBARB.—Some fair sales are reported this week at fully former prices, and the market tends to harden a little. Shensi, bold, 4s. 3d. to 4s. 6d.; Canton, fair fracture, 2s. 5d. to 2s. 6d.; high dried, flat, 2s. 1d.; rough coated, 1s. 6d.; round horny, 1s. 2d. to 1s. 4d. per lb., as to quantity.

RUBBER.—After fluctuating all the week the market is about level, and a steady business is being done. Standard ribbed smoked sheet, spot, 4 5/16d.; August, 4 3/16d.; September, 4 7/32d.; October-December, 4 5/16d.; January-March, 1934, 4 7/16d.; April-June, 4 17/32d. per lb. Closing quiet and slightly easier.

SAEERON.—Dealers report market is steady, but dull; spot, prime B.P., 57s. 9d.; extra B.P., 54s.; super B.P., 51s. per lb., and slightly less for bulk quantities.

SARSAPARILLA.—Business in small parcels on spot, market is steady; spot, native mixed colours, 1s. 1d. to 1s. 2d.; grey Jamaican, 1s. 9d. to 1s. 10d. per lb., as to quantity.

SEEDS.—ANISE.—Spot, Spanish, 52s. 6d.; Bulgarian, 40s., duty paid. CANARY.—More inquiry. Spot, Mazagan, quoted at 14s. 9d.; Tangier, 12s. 6d.; Kenitra, 12s. 6d. LINSEED.—Unchanged on spot, Mazagan 15s. and Morocco 14s. CORIANDER.—Morocco, 1929 crop, 15s. to 15s. 6d.; spot, 1932 crop offering at 15s. 6d. in bond. New crop for shipment quoted at 14s. 9d., c.i.f. CUMIN.—No Malta. Morocco on spot quoted at 47s. 6d. For shipment (new crop), 48s. 6d., c.i.f. FENUGREEK.—Morocco on spot sold at 13s. 6d. New crop for shipment is dearer; £10 10s. per ton, c.i.f., now quoted. CARAWAY.—Dutch has slumped to 46s. per cwt., duty paid, MUSTARD.—English remains firm, 23s. 6d. to 34s., according to quality.

SENEGA.—Shipment offers for new crop are firm at 1s. 11d. per lb., c.i.f., and it is reported the crop is very short, being about one-third of the normal requirements. Spot is dearer and now offered at 2s. per lb.

SENNA.—A few arrivals of the lower grades of Tinnevelly leaves are reported, but there is a scarcity of the fine quality. It appears that the bulk of the manufacturing qualities of Alexandrian pods have been shipped, and higher prices are expected for the remainder.

SHELLAC.—After falling back sharply, the market is recovering and closes steady. Spot, standard TN orange, 66s. 6d.; fine orange, 75s. to 127s. 6d.; pure button, 77s. 6d. For delivery, TN, August, 61s. 6d.; October, 62s. 6d.; December, 64s.; March, 65s. For arrival, TN, August-September, 56s. 6d. per cwt., c.i.f.

TRAGACANTH.—There has been a very fair business done this week in grades ranging from 80s. to 120s. per cwt., mostly for export. Prices for all grades are fully maintained, and the market continues firm.

TURMERIC.—Market is maintained, but is quiet. Madras finger, 23s. spot; shipment, 19s. 9d. per cwt., c.i.f.

WAX (VARIOUS).—There has been a better demand for Carnauba, and prices are well maintained. CARNAUBA, fatty grey and chalky grey, 70s. in bond and 64s. c.i.f.; Primeira, 145s. in bond and 130s. c.i.f.; Mediana, 142s. 6d. in bond and 127s., c.i.f., nominal. BEES'—Benguela, 97s. 6d.; Abyssinian, 97s. 6d.; Calcutta, 117s. 6d. per cwt., ex store, duty paid.

Essential Oils, etc.

AN item of interest in the shipment markets is the indication of firmer conditions for the French oils, particularly lavender. Growers are getting a better price for jasmin flowers. Lemongrass shows a further sharp advance. Californian orange is dearer. Spanish spike, new crop, is firm. Wormseed is recovering. Japanese peppermint is dull.

ALMOND.—The recent advances are well maintained. English, cwt. lots, 2s. 6d., and up to 2s. 8d. per lb. for small lots. Foreign, sweet, cwt. lots, 2s. 4d. up to 2s. 7d. per lb. for small parcels.

ANISE (STAR).—Spot is rather dearer with forward unchanged and quiet: spot, "Red Ship," in leads, 1s. 11d.; in tins, 1s. 9d.; in drums, 1s. 7½d.; shipment, in leads, 1s. 9½d.; in tins, 1s. 7¾d.; in drums, 1s. 7d. per lb., c.i.f.

APRICOT KERNEL.—Makers are quoting 1s. 4d. for cwt. lots and up to 1s. 6d. per lb. for smaller quantities.

BERGAMOT.—The shipment market for guaranteed new oil is dearer at about 5s. 6d. up to 6s. 1d. per lb., c.i.f., with other offers at cheaper figures. Spot is dull with quotations from 5s. up to 6s. 6d. per lb., as to brand and quantity.

BOIS DE ROSE.—The shipment market for Brazilian is reported dearer at about 3s. 6d. to 3s. 7d., c.i.f. Spot, in drums, 4s.; in tins, about 4s. 3d. per lb.

CAJUPUT.—Market is steady but dull. B.P., 1932 quality, 2s. 3d. to 2s. 6d.; green, 1s. 10½d. to 2s. per lb., as to quantity.

CANANGA.—Shipment offers are now steady at not less than 6s. per lb., c.i.f., for quantities. Spot, about 7s. 4d. to 7s. 9d. per lb., as to quantity.

CARAWAY.—Most holders are asking fully 10s. 6d. for Continental on spot; the shipment figure is about 9s. 3d. per lb., c.i.f.

CASSIA.—Rather quieter market this week, but prices are fully steady. Spot, from 3s. 7½d.; shipment, 3s., in drums and 3s. 1½d. per lb., c.i.f., in tins.

CEDARWOOD.—A very fair business continues to be done at current cheap prices. African, spot, 1s. 6d. in drums and

1s. 8d. per lb. in tins. The American product is also at attractive figures.

CINNAMON LEAF.—The spot quotation continues in the region of 2s. 9d. to 3s. per lb., as to quantity.

CITRONELLA.—These products have had a poor week and the general tone is none too good. Ceylon, spot, 1s. 11d. for small quantities; shipment, 1s. 7d. per lb., c.i.f. Java is unchanged; spot, 2s. 6d. for small parcels; shipments, 2s. 0½d. per lb., c.i.f.

CLOVE.—The spot value of Madagascar is holding at about 3s. 9d. per lb.; shipment, about 3s. 2d. per lb., c.i.f.

EUCALYPTUS.—A little forward business is reported, market steady. Australian, 70 to 75 per cent., 11d. to 1s.; 80 to 85 per cent., 1s. to 1s. 1d. per lb., and slightly less for bulk quantities. Spanish, 1s. 2d. per lb.

GERANIUM.—This market remains dull with no change to report. Bourbon, spot, 23s.; shipment, 21s. per lb., c.i.f. Algerian, spot, 23s. 6d. per lb.

GINGERGRASS.—There is still but very little inquiry. Spot, 6s. 6d. to 6s. 8d.; shipment, 5s. 9d. per lb., c.i.f.

JASMIN.—It is reported that the price agreed to be paid for the new crop flowers is six francs fifty cents, as compared with three francs per kilo last year.

JUNIPER BERRY.—Market is steady but dull. Spot, about 3s. 6d. per lb., and slightly less for bulk quantities.

LAVENDER.—It is reported that quotations for French new crop, which will be ready by September, are to be advanced by about 20 per cent. on the prices ruling for last season's oil.

LEMON.—Inquiry continues on modest lines. Sicilian, hand-pressed, 3s. 5d. to 3s. 9d., c.i.f.; spot, 3s. 9d. to 4s. 3d. per lb., as to brand and quantity. Californian is unchanged, with a small demand. Spot, in large drums, 48 cents, and in small drums, 49 cents per lb.

LEMONGRASS.—A further advance in shipment prices is recorded, but there appears to be very little material offering: quoted at about 3s. 4½d., c.i.f. Spot has been selling at varying prices up to 3s. 6d. per lb. and higher.

LIME.—This market seems to be dull, but spot values for West Indian are firm at about 35s. to 37s. per lb., with supplies limited. New crop prices are expected shortly.

MANDARIN.—Spot offers range from 14s. to 15s. per lb., as to quality and quantity.

ORANGE.—This market seems to have been generally quiet. Sicilian sweet, spot, 5s. 2d. to 5s. 8d.; shipment, 5s. to 5s. 3d. per lb., as to brand and quantity. Californian is quoted dearer, with a fair business being done. One case, 61 cents; two or more cases, 56 cents per lb., c.i.f.

PALMAROSA.—Business has been a little better; market steady. Spot, 7s. 6d. to 7s. 8d.; shipment, 6s. 10d. per lb., c.i.f.

PATCHOULI.—A fair inquiry with the market steady. Spot, 7s. 3d. to 7s. 4d.; shipment, 6s. 10d. per lb., c.i.f.

PEPPERMINT.—The spot market for Japanese remains dull and is quoted at about 5s. 4½d. to 5s. 6d. per lb. Shipment is about steady, but business is poor: afloat, 5s. 3d.; July-August, 5s. 2d.; October-December, 4s. 11d. per lb., c.i.f. The American natural oil continues firm and offers for shipment are limited. Quoted at about 3 dollars 10 cents per lb. in drums, c.i.f. Business has been fair.

PETITGRAIN.—Rather more inquiry; values steady: spot, 3s. 8d. to 3s. 9d.; shipment, 3s. 2d. per lb., c.i.f. French, new crop, is being quoted at 32s. per lb.

ROSEMARY.—Prices vary with the quality, with the best oil at 1s. 8d. per lb. for small quantities and less for bulk lots. A moderate inquiry is reported.

SANDALWOOD.—English-made West Indian continues in fair demand: one cwt., 6s. 9d.; 56 lb., 6s. 10½d.; 14 lb., 7s. per lb. Genuine East Indian Mysore, first-hands, 20s. per lb.

SASSAFRAS.—A small business, with prices ranging from about 3s. 8d. up to 5s. per lb., as to quality, with artificial at cheaper prices.

SPEARMINT.—Inquiry is limited: spot, quoted at about 8s. 3d. to 8s. 6d.; shipment, about 7s. 3d. per lb., c.i.f.

SPIKE.—For good-quality new crop Spanish well up to 2s. 11d. per lb., c.i.f., is reported to have been paid. Spot, about 3s. 6d. per lb., as to quality and quantity.

WORMSEED.—The market is better this week, with shipment figures rather dearer at 9s. 3d. per lb., c.i.f. Spot is now at 10s. 6d. to 10s. 9d. per lb., as to quantity.

Fixed Oils, etc.

MOST of the products in this market are keeping steady and business is fairly satisfactory. Palm oils continue to be quoted for shipment only, except for bleached. Linseed oil is firm and American turpentine continues to cheapen. ACID OILS.—Values show a slight appreciation with a fair business being done: coconut and/or palm kernel, 20s. 6d.; groundnut, 20s. 3d.; soya, 15s. 3d., spot. CASTOR.—A fair amount of business is moving and prices are being steadily maintained: pharmaceutical, 41s.; first pressings, 36s.; second pressings, 33s. (barrels), cases £4 per ton extra, ex mills, Hull, in not less than one-ton lots; Bombay, 26s. 6d. (drums), c.i.f. COCONUT.—Business has been only moderate; quoted prices slightly easier on the week: deodorised, 29s. (barrels), spot; Ceylon, 19s. 3d. (drums), c.i.f. COTTON.—Values for all grades are keeping steady and business has been fair: deodorised, 28s.; common edible, 26s.; soapmaking, 25s.; crude, 23s. 9d. (barrels) spot. GROUNDNUT.—Market is about unchanged with business limited: deodorised, 31s. 6d. (barrels), spot; crude Oriental, 27s. 3d. (drums), c.i.f. LINSEED (RAW, NAKED).—Values are slightly better following the recent slight decline, and the market is dull: on spot, 22s. 3d.; August, 20s. 9d.; September-December, 21s. 1½d.; January-April, 21s. 10½d. Boiled oil, spot, 24s. 9d. OLIVE.—Rather more business has been transacted and prices are now very steady and tend to harden: edible, in tins in cases, 70s. per case of ten gallons; B.P., 4s. 6d. per gallon, in 40-gallon barrels. PALM.—Only shipment offers are being made for all grades except bleached; prices quoted show a slight advance: Lagos, 17s., c.i.f.; softs, 16s. 6d., c.i.f.; medium, 17s., c.i.f.; hard, 17s. 6d., c.i.f.; bleached, 20s. 9d., spot. PALM KERNEL.—The market is well maintained and business has been fair: deodorised, 28s. 9d.; crude, 20s. 9d., spot. RAPE.—Market is steady but rather quiet: refined, 32s. 3d.; crude, 30s. 6d., spot. RESIN.—Market is quoted unchanged and steady but rather slow: B, 13s.; D, 13s. 3d.; F/G, 14s.; N, 15s. 6d.; W/G, 16s.; W/W, 16s. 6d. per cwt., ex wharf. SOYA.—Rather more inquiry with prices keeping steady: deodorised, 29s. 3d.; crude, 24s. 9d., spot. TURPENTINE, AMERICAN.—Quoted values continue to cheapen with the market dull: total London stocks, 10,468 barrels: on spot, 48s. 9d. WOOD.—Hankow in barrels is again dearer and is now quoted up to 58s. spot.

Trade-Mark Applications

The figures in parentheses refer to the classes in which the marks are grouped. A list of classes and particulars as to registration are given in "The Chemist and Druggist Diary," 1933, p. 329.

(From "The Trade Marks Journal," July 19, 1933)

"SUPERASP No 15" on design with words "Walfox Brand" on triangle under fox, etc.; for aspirin (3). "SPASBURG SALTS No 43" on design with words "Walfox Brand" on triangle under fox, etc. ("No. 43" disclaimed); for salts for rheumatism, etc. (3). "ELECTRIC LUNG MIXTURE No. 14" on design with words "Walfox Brand" on triangle under fox, etc.; for lung mixture (3). By Walfox, Ltd., Clerk Green Mills, Batley. B 537,669; 537,671 (Associated); B 537,905.

"SILF BRAND OBESITY TABLETS" with design including silhouette of woman; for a preparation for obesity (3). By The Silf Co., Ltd., 39 Shaftesbury Avenue, London, W.1. B 540,899.

"TYMO" on design incorporating mountains and clouds; for medicated toilet paper (3). By Southall Bros. & Barclay, Ltd., 19-21 Lower Priory, Birmingham. 540,963.

"RAYS FOR WARMTH" on circular design of rays (3); for medicated sweetmeats (3). By Cupal, Ltd., King Street Bridge, Blackburn. 537,220. (Associated.)

"SUN-O-LIFE"; for medicines (3). By Turner & Co., 35 Condray Road, Southport. 540,401.

"HALIBORANGE"; for medicinal chemicals containing orange juice (3), and for a food containing oil and orange juice (42). By Allen & Hanburys, Ltd., Plough Court, 37 Lombard Street, London, E.C.3. 540,917/919 (Associated.)

"MUTUS" over facsimile signature "George Burgess"; for medicinal chemicals (3). By G. Burgess, 94 Poulton Street, Kirkham, Lancashire. 541,635.

"IORAK" and "MANODINE"; for all goods (3). By G. H. Cowley, Governors Road, Onchan, I. of M. 541,683/684.

"HI-PED"; for medicated foot powder (3). By R. B. Burney, 7 Albemarle Street, London, W.1. 541,827.

Correspondence

Letters should be written on one side of the paper only. Correspondents may adopt an assumed name, but must in all cases furnish their real name and address to the Editor

National Health Insurance

SIR,—One looks in vain among the newspaper reports of the luncheon held recently to celebrate the twenty-first anniversary of National Health Insurance for any reference to the help given by chemists in the administration of the Acts. Medical and dental organisations and the friendly societies receive their eulogies, but of the chemists—not a word. This, perhaps, is not surprising. When medicine calls a feast, the humble handmaid, pharmacy, must keep discreetly in the background. The coming-of-age festivities naturally lead to speculations on future developments of the Acts. From time to time the suggestion is made that more attention should be given to the welfare of the insured population by periodical medical examination and the inculcation of simple rules of health, and less time and money spent on the prescribing and dispensing of palliatives for people who are already ill. If this scheme were put into practice, how would it affect the chemist in his rôle of dispenser to the nation? Mr. Lloyd George, as was to be expected, had nothing but praise for his offspring; but public opinion is not wholly in favour of the Acts. It is alleged, for instance, that National Health Insurance has resulted in a habit of hurried and slipshod diagnosis, and in the excessive use of medicaments. But the most serious criticism levelled against it is that it relieves the insured worker of the onus of being personally responsible for his own health. It encourages the belief that indiscretions of diet, and other transgressions against the laws of health, may be freely indulged in, because the appropriate remedy, in the form of a "bottle," tablet, or pill, may be had free of charge on application to the doctor. There is truth in this assertion, but is it not applicable to all forms of State beneficence that minimise the responsibility of the individual? On the broad view National Health Insurance has undoubtedly resulted in an improvement in the well-being of the community; and chemists may congratulate themselves on the part they have played in bringing about this desirable consummation.—Yours faithfully,

Nottingham. BERNARD W. GILL.

SIR,—The coming of age of the National Health Insurance Act has led to congratulatory effusions on the part of some daily papers. For my own part I have never heard of any enthusiasm for the panel business from the workers—that is to say, the people forced to contribute. It is easy to back up a measure of this kind when not personally involved. Sixty-five years ago I entered the ranks of pharmacy, and being by all accounts "a bright lad" it was not long before I was fairly well up in the routine of shop practice. They were days when the apprentice had to take off his coat and take down the shutters, sweep the floor, dust the bottles and counters, etc. Very soon I was competent to sell most of the stock except, I think, laudanum (and possibly paregoric). One of the preparations I sold was called "Foxes' Lungs and Paregoric," for which we had printed labels and a shop round of 40 oz. capacity. It was sold in pennyworths for coughs, and I never heard of anything unusual happening. This particular preparation—syrupus scillæ or oxymel scillæ with paregoric—has taken a place in our N.H.I. Formulary. Half an ounce or an ounce with water to 8 oz. makes a good bottle—i.e., good enough for a panel patient. No longer does one sell a pennyworth or two over the counter, but to obtain the same what a lot of trouble for the patient, and what a difference in cost! Signing on, visits to the doctor, bringing one's own bottle, waiting in the passage and so on, and all this for what as a lad I could sell for a penny or two. The frequent boast of equal treatment of panel and private patients is all bunkum. Find in the formulary a suitable recipe under a number, and the doctor is not going to write out a prescription. The fact was brought to my immediate notice by an old customer of my own who used to bring a prescription for his ailment (and a good one too). On the panel he was fobbed off with the simple squills and paregoric mixture. It is hard to discover all this kind of thing to be for the better. It is no doubt progress of a kind, and that is all one can say.—Yours, etc.,

J. P. (21/7).

Gratuitous Services

SIR,—"A. S.," discussing "Small Profit Transactions" (*C. & D.*, July 15, p. 65), states that although chemists run their businesses for legitimate profit, there are occasions when this profit is not apparent. It often occurs to me, when performing some of those gratuitous services that the chemist is called on to do, to consider how many of the other traders in the town do something or supply anything for nothing. And if the comment should be made that chemists are endowed with a semi-professional status, I would inquire further how many of the people practising the professions offer free advice and service to their clients. My experience in a thickly populated neighbourhood, with a surplus of chemists' shops, company concerns, drug stores and bazaars, leads me to the conclusion that many of the persons on our free list are not nearly so impressed by our kindness as we should like them to be. The old style of customer, who purchased all their supplies at one chemist's shop and never dealt elsewhere, is practically extinct in such a district as this. The type of panel patient who seldom makes a purchase and who comes without a bottle is familiar to us all. For minor first-aid cases it is rarely possible to make any charge; but I have yet to find that many of these people we befriend carry their gratitude to the extent of bestowing on us all their future business. The only thing one can do is to keep a Benevolent Fund box handy, and to suggest that a donation will cover the service rendered; at least there is a sporting chance of some provision for the declining years.—Faithfully yours,

FREE SERVICE (24/7).

Price Cutting of Proprietary Goods

SIR,—Until Government action is taken (to which we all look forward) regarding coupons, I hope that retailers will "cut out" every such scheme wherever possible. The open and blatant price cutting needs our constant attention. We have a P.A.T.A., but its onerous duties are seriously increased because of the lack of precaution taken, knowingly and unknowingly, by manufacturer and retailer in supplying goods to cutters whose regular supplies have been rightly closed owing to the activities of the P.A.T.A. Both manufacturer and retailer need to keep in mind fair profits in buying and selling. What manufacturer can say he has never bought under "ring" prices from a member of a "ring"? What retailer can disown having ever accepted an advantage in price from a seller of a P.A.T.A. commodity? By such means we all share in undermining price protection created for fair profits and incidentally more employment. For example, we get a caller offering us, from carried stock, electric light globes under standard prices. Should we buy, we take business from the electricians who may have a shop in our block. Also, by helping to make the journey worth while to the travelling hawker, his next visit may include some of our own commodities for sale to our fellow shopkeepers. Looking further afield, with regular persistence we receive bonus and quantity offers from the manufacturers. The offers of large parcels are usually so attractive that small parcels appear unprofitable to handle. This has created the collective quantity buyer in the trade, and provides the opportunity for the price cutter, and his friends, to secure the commodities he cannot obtain through the usual channels. Maybe the seller is told that the goods are for a distant market; but such is the organisation of

the "price-cutting combine" that the writer can vouch for the fact that goods, after travelling through many hands, have eventually been sold at a cut-price store adjacent to the man who first bought upon bonus terms, and unwittingly resold indirectly to a cutting business rival. The manufacturers who make such extensive quantity discounts are, I submit, to blame. Possibly output is the only goal in sight. Without trying to preach, I think that business morality is being undermined by thoughtless and selfish little acts that creep into it. The director who passes over his private personal correspondence to be posted at the expense of the firm is definitely robbing the shareholders. The manager who gets a business friend to buy him some personal goods "through the trade" is robbing some home store of his small profits. The clerk who buys various commodities at trade prices for his or her friends affects the businesses of many retailers in various districts. Fair, open competition is good for all of us, but not the competitive actions of the contract-breaker, the bonus quantity distributor, and the illicit buyer and seller.—I am, etc.,

FAIR PLAY AND NO FAVOUR (17/9).

Hints for Wholesalers

SIR,—As a retailer in a small way of business I do not presume to tell a wholesaler how to conduct his affairs. But in my dealings with wholesalers I frequently meet with small annoyances, which they inflict upon me, perhaps, all unknowingly; and since it is to the advantage of everyone concerned that business relations should be cordial and co-operative I trust, Sir, that you will allow me to give these trifling vexations an airing in your columns. First, I would urge wholesalers to be brief in their communications. Even in these slack times the small man is a busy man, for he is running his shop on a reduced staff, or no staff at all. His mail is always bulky, and much of its matter is superfluous. The printed word is produced to be read, and it frequently fails of its object from sheer prolixity. Often I receive an extravagantly printed announcement of a new product, or a new advertising campaign for an old product, spend precious minutes getting down to the gist of the matter—and by next post receive a duplicate copy of the same rigmarole! Sometimes, too, I get invoices, etc., intended for a chemist in the next street, whose shop number is the same as mine. One firm invariably addresses me by a name which does not appear on my business heading, with the result that a small gust of irritation blows over me. Brevity and accuracy, then, I would regard as essentials in the wholesaler's approach to the retailer. An old bone of contention is the failure to send invoice or delivery note with goods. This neglect causes endless trouble to the small trader. Alterations of price, whether higher or lower, if notified on invoice, enable the trader to adjust his retail prices promptly, and so avoid loss on the one hand, or the risk of being accused of excessive charges on the other. Prompt credit for empties returned is also appreciated by the man who is his own invoice clerk. Then there is the little matter of showing discount, if any, on statements, and date when payment is due. Retailers have the wholesalers to thank for a hint which, unfortunately, they are rarely able to take advantage of. I refer to the custom of never charging less than 6d. for small quantities of drugs and chemicals.—Yours truly,

SINGLE SHOP (18/7).

Old Pharmacy Drawers

SIR,—Are the "Old Pharmacy Drawers" so accurately and brightly described by your contributor (*C. & D.*, July 15, p. 61) now uncommon? A friend to whom I read the notes is, I am afraid, still unconvinced that it was not my personal description of my father's shop. In the days when my elder brother's departure left me the long-coveted position of shop-duster (at 4d. a week), I was not interested in the Latin names of drugs; but I soon learnt that "C. Ulmi" was the pharmaceutical term for string; and if I ever saw another drawer so marked I should be terribly disappointed to find it did not contain that indispensable article for peg-tops, netting hammocks, and endless other uses.—Yours faithfully,

AN OLD BOY (19/7).

Miscellaneous Inquiries

When samples are sent particulars should be supplied to us as to their origin, what they are, what they are used for, and how. We do not undertake to analyse and report upon proprietary articles nor to publish supposed formulas for them.

E. K. (20/6).—COMPLEXION CLAYS.—Mud or clay packs are generally either fuller's earth, kaolin or kieselguhr, and they are made up with starch paste, mucilage of tragacanth or a non-greasy cream (see also *C. & D.*, 1922, I, 595). Analysis of various packs has revealed that some contain magnesium sulphate, and nearly all show the presence of borax and magnesium carbonate. Witch hazel cream can be added with advantage, and perfume as desired:—

I		II	
Kieselguhr	60·00 gm.	Fuller's earth	500 gm.
Borax	1·00 gm.	Glycerin	25 gm.
Menthol	0·05 gm.	Oil of bergamot	10 c.c.
Oil of neroli	0·05 gm.	Tincture of benzoin (1 : 5)	200 c.c
Oil of rose	0·05 gm.	Water	125 c.c.
Glycerin	25·00 gm.		

Distilled water to make a paste.

F. L. O. (22/68).—FLY SPRAYS.—The formulas below are representative of the preparations most popular at present:—

I		II	
Pyrethrum	400	Insect powder	8 oz.
Camphor	50	Paraffin	1 gall.
Cedar wood oil	150	Methyl salicylate, eucalyptus oil or safrol	1 oz.
Citronella oil	25		
Lavender oil	25		
Spirit	to 2,000		

Extract the pyrethrum with the alcohol, strain and add the other ingredients.

Macerate the pyrethrum in the paraffin for 48 hours, strain, and add the other ingredients.

J. T.—FURNITURE POLISHES.—

I		II	
Linseed oil	5 parts	Linseed oil	512 parts
Turpentine	3 parts	Spirit	24 parts
Cedar-leaf oil	2 parts	Butter of antimony	12 parts
Carbon tetrachloride	4 parts	Acetic acid	3 parts
		Hydrochloric acid	3 parts

Apply to the furniture by means of a soft cloth, rub well and polish with a dry duster.

Mix and allow to stand one week before use.

J. A. D. (16/68).—REDUCING ROOM TEMPERATURE.—The preparation for reducing room temperature is a heavy colourless, nearly odourless aqueous liquid, which contains potassium nitrate, sodium chloride (the two together about 12.5 per cent.) and reducing sugar (about 8 per cent.). It is used by placing a quantity in a refrigerator at −10° and allowing to freeze solid. It is then taken out and placed in a room to cool it, which it does by absorbing heat, and becomes reduced to a liquid. The process is then repeated as often as necessary.

Retrospect of Fifty Years Ago

Reprinted from
"The Chemist and Druggist," July 14, 1883

Isinglass

Perhaps the earliest good account of isinglass in English was a letter from Humphrey Jackson, Esq., to William Watson, M.D., which was read before the Royal Society in 1772, and is published in the "Philosophical Transactions" . . . . Comparatively little of practical value has been added since his time, and it is curious to see his turns of expression appearing and reappearing in later works, even down to Simmonds's "Commercial Products of the Sea." Jackson gives figures showing how the moist bladders are fastened over wooden pegs to give them the curious long and short staple forms.

EFFERVESCING LIVER SALINE

In square white glass bottles with Compo.-topped corks

Each bottle in an attractive carton

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This reliable preparation is a credit to any Pharmacy

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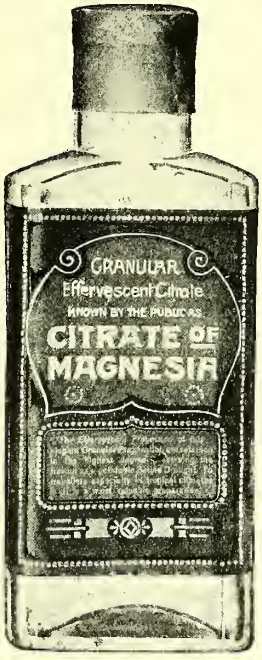
Bottles 7-oz. (Fluid Capacity) per doz. 11/6 Net

Retail 1/9 P.A.T.A.



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In attractively labelled bottles

FINEST QUALITY		SECOND QUALITY
5/- per doz.	4-oz. Fluid capacity	4/3 per doz.
8/- „ „	8-oz. „ „	6/9 „ „
10/3 „ „	12-oz. „ „	9/- „ „

MEGGESON & Co. Ltd.

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Telephone: BERMONDSEY 1741 (2 lines) Private Branch Exchange

Established over 130 years

Experience DOES count

BRONNLEY'S CREAM

So easy to sell in Summer

The show material, the advertising and the name sell Bronnley's Cream the *first* time—the superfine quality of the cream ensures repeat orders. You will satisfy your most critical customers by recommending Bronnley's Cream (Made with Lemon). **3/8 6/6 10/- 20/-** per doz.
6d. 10½d. 1/3 2/6 each, retail.

Write for this most attractive show-stand, mentioning the C. & D. It is free upon request.

BRONNLEY

Makers of the Celebrated Bath Soap

LONDON

NEW 'ASPRO' WINDOW DISPLAY

Just off the Press

Here's news for 'ASPRO' distributors. A new 'ASPRO' Window Display is just off the Press. It is handsomely printed in six colours and is generally considered to be our best effort to date. It is an artistic adjunct to any chemist's window and should be a good sales puller. Might we suggest you write us so that we can send you one of these displays, post free, by return mail. 'ASPRO' advertising is still being pushed vigorously. The more often you show your display the greater result you will obtain from the advertising. So you see it is worth while writing to-day.

'ASPRO' consists of the purest Acetylsalicylic Acid that has ever been known to Medical Science, and its claims are based on its superiority.

ASPRO REG. TRADE MARK

Agents: GOLLIN & CO. PTY. LTD.

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'ASPRO' CHEMISTS' BAGS AND ENVELOPES

— PRICES —

Kristal Envelopes - -	2/6 per 1000
Greaseproof 2oz. Bags -	1/- per 1000
Greaseproof 2oz. Bags (long)	1/6 per 1000

CASH WITH ORDER

BUY 'ASPRO' ON BONUS TERMS AND SAVE 17%

COLLOSOL LACTO-CALAMINE

Collosol Calamine combined with the soothing emollient of Milk of Almonds.

Effective in sunburn and every skin blemish at all seasons.

Specially valuable for nursery use and in all skin ailments, teething rashes, etc.

Supplied with an attractive showcard
AT SPECIAL BONUS TERMS

For full particulars write:—

THE CROOKES LABORATORIES
(BRITISH COLLOIDS LTD.)
PARK ROYAL, LONDON, N.W.10

Telephone— Willesden 6313 (3 lines)
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Doctors have known and prescribed Argyrol for over twenty five years

NOW, its wider use means they will prescribe it even more!

ARGYROL

Registered Trade Mark

brand SILVER VITELLIN

7/6 per oz. c.f.

As medical science advances, Argyrol is used increasingly by Hospitals and Physicians to combat the virulent and obstinate strains of micro-organisms which are found to invade the delicate mucous membranes. The Medical Profession is now being reminded by literature and specialised advertising in the principal Medical Journals that Argyrol is an original product, unique in composition and therapeutic effectiveness. Be sure that you have genuine Argyrol brand Silver Vitellin available for prescriptions.

Sole Distributors: **FASSETT & JOHNSON LTD., 86, CLERKENWELL ROAD, E.C.1**

'CLARKES'

BRAND

WORLD-FAMED BLOOD PURIFYING MEDICINE

'BLOOD MIXTURE'

Registered Trade Mark Brand

UNSTAMPED STOCK

FOR SALE IN GREAT BRITAIN

(BY CHEMISTS ONLY)

	Retail	3 doz. Cases	12 doz. Cases
'Clarkes' 'Blood Mixture' BRAND (LIQUID OR TABLETS)	3/-	£4/1/-	£15/6/-

NET. CARRIAGE PAID. PACKING FREE

ASSORTED ORDERS

	Retail	Min. value £4/1/0 per doz.	Min. value £15/6/0 per doz.
'Clarkes' 'Blood Mixture' BRAND	3/-	27/-	25/6
,, ,, ,,	12/-	108/-	102/-
,, ,, ,,Tablets	3/-	27/-	25/6
'Clarkes' Skin Lotion BRAND	- 1/3	11/6	10/6
'Clarkes' Salve -	- 1/3	11/6	10/6
,, ,, -	- 3/-	27/-	25/6
,, ,, -	- 5/-	45/-	41/6
'Clarkes' Aperient Pills BRAND	- 1/3	11/6	10/6
,, ,, ,,	- 3/-	27/-	25/6
'Clarkes' Medicated Soap Box 3 Tablets	2/6	8/-	7/6
Single Tablet	1/-		

Orders may be assorted as desired at above rates, provided the minimum values reach **£4/1/-** or **£15/6/-** respectively.

Carriage Paid. Packing Free
Terms—Strictly Net, Monthly Account

Order Your Supplies NOW, either Direct or through your usual Wholesale House

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Telegrams: 'Lindum, Lincoln.' Telephone: Lincoln 55

"YOU'RE "ALL OUT" FOR BUSINESS?

For thousands of people Box's Pills are the standard remedy for all digestive disorders. The demand is steady and increasing—largely through the recommendations of users.

To secure your share of the profitable flow of business it is necessary to inform the demand which passes by your establishment. Telling window and counter display material is free on request.

Obtainable from wholesalers or direct from the proprietor

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PLYMOUTH

Telegraphic Address: "Giant" Plymouth.

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BOX'S INDIGESTION PILLS

Petroleum Jelly

"SALVO PETROLIA" BRAND

The Perfection of Petroleum Jelly

PACKED IN BARRELS, KEGS, OR SMALLER PACKAGES IF DESIRED

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THE DEE OIL CO. LTD.

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Phone: Bootle 186 Wires: "Cestrian, L'pool"

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WHITE OILS, B.P. & Technical qualities
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the unfailing cure for Eczema

Unprecedented Profits

Send an order to your regular wholesaler for three of the new Daisy container display cards (30's) costing 2/9d. each. You will make no less than 82% profit on your outlay.
Make the heavy Daisy advertising swell your own turnover and profits by always keeping this card on display.

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ADVICE TO MANUFACTURERS AND TRADERS.

The Council of the Trade and Technical Press has received representations from advertisers, individually and collectively, with the request that Trade and Technical Journals should draw attention to the wisdom of scrutinising very closely any propositions which may fall under one or other of the following heads :—

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Composite pages generally relate to new public works and undertakings, and no objection can be taken to them when carried out on the proper lines. Any proposal, however, to participate in a composite page should be fully investigated, since it can be used as an indirect means of inducing contractors or sub-contractors to spend money on unprofitable advertisement : for example, the names of the principal undertaking or of directors or officials responsible for the placing of contracts or orders may be put forward as sponsors for the scheme, with the result that, rather than risk offence, the contractor or sub-contractor may agree to participate by giving an advertisement ; and the advertisement may be quite unprofitable to him, since the page may consist of a small amount of editorial and a large number of advertisements, and the advertisements, owing to their specialised character, may not be of interest to the bulk of the readers of the publication.

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The Council of the Trade and Technical Press,
E. O. NORTON,
Secretary.

6, Bouverie Street,
Fleet Street,
London, E.C.4.

The CHEMIST AND DRUGGIST SUPPLEMENT

This Supplement is inserted in every copy of The Chemist & Druggist

28 ESSEX STREET, LONDON, W.C. 2

JULY 29, 1933

ADVERTISEMENT TARIFF

ALL ADVERTISEMENTS are PREPAID, so that remittance must accompany instructions in each case. If it be necessary to telephone or telegraph an urgent announcement this may be done, provided the money is telegraphed at the same time.

BUSINESSES WANTED and for DISPOSAL, PREMISES TO LET and FOR SALE, PREMISES WANTED, PARTNERSHIPS, GOODS for SALE and AGENCIES—6/- for **50** words; every additional **10** words or less, **6d.** (Box No., **1/-** extra.)

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SITUATIONS WANTED—2/- for **18** words; every additional **10** words or less, **6d.** (Box No., **1/-** extra.)

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THE CHEMIST & DRUGGIST, 28 Essex St., Strand, London, W.C.2

Telephone: Central 6565 (8 *lines*). *Telegrams: "Chemicus, Estrand, London."*

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All advertisements intended for insertion in this Supplement must reach us not later than FIRST POST THURSDAY MORNING

ORRIDGE & CO.

56 LUDGATE HILL, E.C.4

ESTABLISHED 1846 *Telephone No.: CITY* 2283

May be CONSULTED at their Offices on MATTERS of SALE, PURCHASE & VALUATION

We make no charge to purchasers, and invite intending buyers to communicate with us, stating their requirements

1.—CROYDON.—Light Family Retail Business situate in centre of thickly populated area; established about 50 years; net profit exceeds £525 p.a., audited figures; double-fronted shop situate in main road, well fitted and heavily stocked; large house; premises held on lease at reasonable rental; price £1,450.

2.—PALMERS GREEN.—Cash Retail Business situate in busy main road; returns exceed £2,500 per annum; scope for large increase; chartered accountant's figures; double-fronted shop, excellently fitted and fully stocked; held on lease at reasonable rental; valuation terms entertained.

3.—VAUXHALL (near).—Working-class Cash Retail Business with large N.H.I. Dispensing connection; established about 100 years; returns exceed £2,700 p.a., of which over £600 is from N.H.I.; accountant's figures; double-fronted corner shop in prominent position on main road and in close proximity to several doctors; living accommodation, with bathroom; rent of shop and house approximately £50 p.a.; price £1,500, or valuation terms entertained.

4.—WEST END.—Good-class Retail Business; established 20 years; returns present rate between £60 and £65 weekly; single-fronted shop situate in excellent position and very nicely fitted in mahogany; good modern stock; genuine reason for disposal; price £2,300.

5.—NORTH LONDON (Residential Suburb).—Family Retail Business with Kodak Agency and N.H.I.; established about 60 years; returns exceed £1,400, and net profit averages £400; corner shop, well fitted and fully stocked; good living accommodation, with bathroom; rent £80; held on lease; price £850.

6.—LONDON.—Wholesale Business returning about £4,000 per annum; net profit £600; accountant's figures; vendor is 80 years of age and has much neglected the business; the turnover has been as much as £80,000 per annum; the business can be bought outright or a partnership entered into; reasonable terms.

7.—CHARLTON (near).—Light Cash Retail Business with good Toilet trade and Kodak Agency; established 11 years; returns present rate £25 per week, plus N.H.I. Dispensing; net profit about £300; double-fronted shop nicely fitted and fully stocked; good living accommodation, with bathroom; held on lease; valuation terms entertained; vendor has undergone an operation and is anxious to sell forthwith.

8.—SOUTH COAST (Popular Health Resort).—Cash Retail Business with Kodak Agency; situate on main artery to sea-front (3 minutes); returns average £3,000 p.a.; scope for large increase with additional capital; double-fronted shop nicely fitted and fully stocked; rent £250; sublet £136; long lease; price £2,500; genuine reason for disposal.

9.—HERTFORDSHIRE.—Middle and Working-class Cash Retail Business; no N.H.I. done at present, but good scope for same; returns this year £824; net profit £241; single-fronted shop, well fitted and stocked; good living accommodation, with room for garage; garden; rent and rates £30s. weekly inclusive; price £225 or near offer.

10.—YORKS (West Riding).—Middle-class Retail Business with Kodak Agency and Wine Licence; returns approach £1,600 per annum; net profit £372; single-fronted shop, well fitted and fully stocked; rent £35 per annum; price £575, or valuation of stock and fixtures; vendor going abroad.

11.—BOURNEMOUTH.—Progressive Retail Business situate in very good position; returns last year £2,339; very good profits are made; large double-fronted shop situate opposite tram stop and adjoining new railway station; mahogany fixtures and good stock; living accommodation, with room for garage; vendor owns property and will sell same or grant a lease at a reasonable rental; valuation terms eutertained.

12.—BERKSHIRE.—Middle-class Retail Business with large N.H.I. connection; established 21 years; returns last year £2,641 under management; scope for increase; corner shop, nicely fitted and fully stocked; living accommodation; vendor owns property and will grant a lease at about £120 per annum; valuation terms entertained.

13.—SIDMOUTH (near).—General Retail Business with N.H.I.; Prescribing and Photographic; returns £1,200 per annum; single-fronted shop, nicely fitted and fully stocked; good living accommodation; rent and rates under £75 per annum; price £300, plus valuation of stock and fixtures, in all about £950; offers entertained.

Chemists' Transfers, Valuations for Sale, Stocktaking & Probate

Special Terms for Income Tax Valuations and Preparation of Accounts by Qualified Accountants.

BUSINESSES FOR DISPOSAL.

BORDER OF NOTTINGHAMSHIRE.—Neglected business, could be considerably increased by energetic man; double-fronted shop in good position; stock in good condition; turnover about £950; net profit £200; price £500; only cash purchaser entertained. 465/36, Office of this Paper.

BOURNEMOUTH.—Well-known Chemists and Druggists; fine main road position; heart busy shopping centre; expensively fitted; double-fronted shop; modern house, garage; turnover £50 weekly and steadily increasing; big scope, rapidly growing estate adjoining; new 21 years' lease or sell freehold; iugoing £2,000 everything, including large stock (estimated £1,000). Griffiths Preese, Bournemouth.

GLOUCESTERSHIRE.—Large town, best position, good-class business, Retail, Dispensing, Photo; Kodak, Selo and Ensign Agencies; also ladies' toilet saloon; Optical nucleus; returns for 1931 £3,050 (gross profit £1,127), 1932 £2,758 (gross profit £1,107); rent, rates, salaries, telephone, light and heat £559 for 1932; accountant's figures given; lease 13 years; returns down January to June, 1933; price £2,300 (approx. value stock and fixtures); bankers' reference required. 472/25, Office of this Paper.

GRAYS, ESSEX, Corner Shop, living accommodation; stock, fixtures and fittings, goodwill; first offer, £150. C. A. Hannam-Harris, 28-29 St. Swithin's Lane, E.C.4.

LEICESTER.—Distinctive Corner Pharmacy; bus stop; middle-class all cash trade, established 26 years; growing neighbourhood; owner retiring September; gross profit average £470; could rent £65; rates, light, £32; Ensign Agency, developing, printing plant; Herbalist; own Proprietaries; business, fittings, utensils, £400; well assorted good stock, £300, approximate valuation. 469/40, Office of this Paper.

LONDON.—Nicely fitted shop, with flat and small garden, in residential district; established 40 years; sadly neglected; present takings £12 approximately, under management; good opening for Optics; price £450 or valuation of stock and fixtures only. 470/6, Office of this Paper.

LONDON, S.E. (Charming Suburb).—High-class Chemist's Business for immediate disposal owing to pending operation; well fitted, double-fronted shop and excellent house; Kodak and Ucal Agencies; turnover £1,250 at good profits; price £850 or valuation terms. Full particulars to genuine buyers only. 469/36, Office of this Paper.

S.E. LONDON.—Genuine High-class established Business for disposal; main road; corner site; modern windows, &c.; average yearly turnover for past 3 years £3,700; excellent living accommodation over; large garage at rear; rent of the whole £125 per year (exclusive); stock at value £850; excellent connection amongst local Doctors; price, including stock, goodwill, fittings and garage at rear, £3,300. Apply Briggs & Co., 1 Perry Vale, Forest Hill. Phone: Sydenham 6391.

SOUTHERN COUNTY.—Chemist's Business for sale; takings under management £12-£16 weekly; good scope for increase under personal supervision; flat available over premises if desired; well-fitted, double-fronted shop; moderate price for quick sale; good reason for disposal; bank reference required. 469/33, Office of this Paper.

SURREY.—Well-fitted Modern Pharmacy, with good house; well stocked; in pleasant growing district; present returns approximately £14 weekly, and steadily increasing, with definite prospects, as there is extensive building in progress; Kodak and Selo Agencies; genuine reason for sale; price £550 or near offer. 469/28, Office of this Paper.

LONDON, N.W.—Old estab. family and dispensing business, situate in busy main road, returning £23 per week. Long lease arranged, at economic rent. Large house attached. Scope for "worker." Reasonable offers considered, for quick sale.
Other propositions (all districts) available.

WESTERN COUNTY.—Country Chemist's Business; nice double-fronted shop; 6 rooms, garden, gas, electricity; nearest opposition 1½ miles; several small villages round about; takings £18-£20, steadily increasing; N.H.I., Kodak; good reasons for selling; price about £435; well stocked. 470/25, Office of this Paper.

BY ORDER OF EXORS.—Harrow Road, W.9. Cash Chemist's Business for Sale; thickly populated neighbourhood; freehold including business; s.a.v.; low price to wind up estate; sole ageuts. Wm. Clarkson & Partners, 2-3 Philpot Laue, Fenchurch Street, E.C.3. Royal 5192.

CHEMIST'S Business for immediate disposal in Essex; long lease; living accommodation available; all at price £450, or offer for lease and goodwill; stock and fixtures at valuation. Further particulars from Francis Nicholls, White & Co., 73 Cheapside, London, E.C.2.

CHEMIST'S Business in busiest centre of Birkenhead; lock-up shop, well fitted and stocked; Kodak Agency; long lease; returns under mauagement approximately £1,000 without Insurance Dispensing; could easily be increased by 50 per cent.; price for quick sale £450 everything. Jaytees, 27-35 Duke Street, Liverpool.

DRUG Stores offering excellent opportunity Qualified Chemist; can add N.H.I.; two doctors in same road; old-established business, now somewhat neglected; premises include double-fronted shop, stock room, dining room, drawing room, three bedrooms, bath; position facing station, S.E. London; nice district; new 21 years' lease; price £375, inclusive. P.C.B. 84/12, Office of this Paper.

GENUINE Business; net profit £300; growing district; stock and fixtures £700; £1,000, all at; good living accommodation; South Coast. 464/70, Office of this Paper.

LIGHT Retail and Dispensing Business, Dorset border; established 70 years; approximate returns 4 years £2,000; good house, garden, side entrance; on main road; owner taking country business; lease about 17 years; rent £120, rates £40; goodwill, lease, fixtures £1,500, stock at valuation; state capital. "Senna," c/o Evans Sons Lescher & Webb, Ltd., 50 Bartholomew Close, E.C.1.

LOW Price for Quick Cash Sale; easily-worked small Business; good N.H.I.; fair living and increasing steadily; working-class; very suitable for middle-aged man; low expeuses; house will sublet for nearly the rent; any reasonable offer considered. Apply 155 Walmer Road, W.11.

NEGLECTED Business, E. London main road; takings £13 weekly; N.H.I.; could do really well under personal management by owner, but is unsatisfactory as a branch under management; moderate rent; good living accommodation; small capital needed to effect purchase. Apply Secretary, 470/35, Office of this Paper.

OLD-ESTABLISHED Chemist's Business for disposal, 63 High Road, Beeston, Nottingham. This district is rapidly developing owing to the erection of exceptionally large new works in the vicinity. Best offer accepted. Valuation about £200. Low rental. Further particulars apply to Terrey Pyatt, Auctioneer and Valuer, 26 Greyfriar Gate, Nottingham. Tel. 43163.

PHARMACY for sale, Leytonstone; well fitted; £450, and stock at valuation; all saleable; rent £40 p.a., rates £20; last year's turnover £990; genuine, bona-fide buyers only, no agents. 472/16, Office of this Paper.

RETAIL and Dispensing Business for Sale, Gloucestershire; genuine offer; turnover about £1,900 per annum; full particulars to intending purchasers; bankers' references essential on application; purchase price about £1,100. Apply 469/21, Office of this Paper.

WELL-FITTED Pharmacy, Kingston/Thames; fixtures, fittings, £350, and stock at valuation, about £200; good position; moderate rent, or freehold, £2,000; bona-fide buyers only, no agents. 472/160, Office of this Paper.

BUSINESSES WANTED.

ADVERTISER, with £1,000 capital, requires a Business with genuine opportunity; between Worthing and Hastings; living accommodation with at least three bedrooms essential. 464/7, Office of this Paper.

COAST, South preferred; turnover £5,000 approximately; a good price will be paid for the right concern; cash purchaser who has just sold his own two businesses waiting. Apply in strict confidence to Orridge & Co., 56 Ludgate Hill, E.C.4.

PREMISES FOR SALE.

CHEMISTS and Druggists, &c., seeking new premises; splendid opportunity occurs in central shopping parade on fast developing area; no opposition; modern shops, front fitted; ample living accommodation; £1,350 freehold; no legal costs. Particulars from D. Salmon, Estate Office, 4 Hampden Hill Parade, Romford. 'Phone: 1465/1496.

PREMISES TO LET.

HARROW ROAD (Main Road).—Well-lighted L.C.C. Factory to Let, 5,000 square feet; excellent condition; stone staircase; drive in, &c.; rent £260 per annum. Apply Owners' Agents, Leopold Farmer & Sons, Factory Specialists, 46 Gresham Street, E.C.2.

KEW GARDENS, LONDON.—Shop to let, with good basement, back room, &c.; excellent opening for Chemist in very attractive neighbourhood; if desired, good accommodation over (5 rooms, bath and w.c.); separate entrance. Apply 470/28, Office of this Paper.

APPOINTMENTS.

CENTRAL LONDON OPHTHALMIC HOSPITAL,
JUDD STREET, W.C.1.

LADY Pharmacist Required; preference will he given to candidates holding the qualifications of the Pharmaceutical Society; hours 12.30 to 5.30 p.m., with evening clinics twice weekly.

Applications, stating age and salary required, together with copies of three testimonials, should reach the undersigned not later than Thursday, August 3.

GEORGE WATTS,
Secretary.

COUNTY COUNCIL OF MIDDLESEX.

Applications are invited as follows:—

AT NORTH MIDDLESEX COUNTY HOSPITAL,
SILVER STREET, EDMONTON, N.18.

CHIEF ASSISTANT DISPENSER, non-resident (Woman); salary £225 per annum, rising £5 annually to £250 per annum, subject to a small temporary abatement in view of the national situation. Candidates for the appointment, which is a full-time one, must be graduates in Pharmacy of a recognised university or hold one of the qualifications of the Pharmaceutical Society of Great Britain. Apply in writing, stating age, qualifications and experience, with copies of not more than three recent testimonials, to the undersigned not later than August 8 (P.A./N/117).

Note.—The successful candidate will he required to undergo such medical examination as the Council may direct, aud, subject to passing the same, to contribute towards the County Council's Superannuation Fund unless subject to the Poor Law Officers' Superannuation Act, 1896.

Guildhall,
Westminster, S.W.1.

By Order,
ERNEST S. W. HART,
Clerk of the County Council.

BUSINESS OPPORTUNITIES.

MANUFACTURER with travellers invited to communicate with advertisers, who wish to market their product, nationally advertised, and would like to co-operate with such a manufacturer whose travellers could carry an extra line. 471/35, Office of this Paper.

PARTNERSHIPS.

CHEMIST, Young, energetic, with excellent credentials, 10 years' provincial and city experience, desires partnership in sound, well-established business, preferably in Scotland, but not essential; capital available £300; could be increased at a later date if both parties agreeable; particulars strictest confidence. 472/15, Office of this Paper.

APPRENTICES.

MEDICAL STUDENT (23), knowledge of Prescribing, Dispensing and Compounding, requires one year's apprenticeship, view qualification. 470/38, Office of this Paper.

YOUNG Lady (17) desires Apprenticeship in good-class Pharmacy; Matriculated; passed First Class Chemistry, first stage; good in Botany; situation Lincs, Yorks or Midlands. E. Evison, 50 Old Brumby Street, Scunthorpe.

SITUATIONS OPEN.

RETAIL (HOME).

BRADFORD.—Lady requires Qualified Lady Chemist; share comfortable home; easy hours; state age and salary, which must be very moderate; references, &c. 470/18, Office of this Paper.

BRIGHTON.—Young Qualified Assistant required at once, of good experience, and used to high-class business. Write, stating full particulars, enclosing photograph if possible, to 472/19, Office of this Paper.

COVENTRY.—Qualified Branch Manager (30-45); tall; efficient Salesman and Window-dresser; remuneration, 10 per cent. turnover on £30 weekly, 5 per cent. over this amount; immediately; send all particulars, copy references, photo (stamped addressed envelope for return). Parker, Chemist, 32 Hertford Street, Coventry.

LONDON, NORTH.—Young Lady wanted, Unqualified, with good experience in Dispensing, Counter, and Window Display; vacancy end of August; give full particulars of experience in first letter, with age and salary required. 224/123, Office of this Paper.

LONDON, N.—Qualified Locum, from August 14 to 26 inclusive; chiefly for N.H.I. and Counter; age, salary and particulars of experience to 470/22, Office of this Paper.

LONDON, S.E.—Experienced Branch Manager required August 8 for main road business; interview essential; give fullest particulars in first letter. P.C.B. 84/14, Office of this Paper.

LONDON, S.E.—Junior Assistant (male) required for a month, commencing August 14; would suit a student who has had a good training in Dispensing and Counter work; applicants please state experience and remuneration to M.P.S., 471/26, Office of this Paper.

LONDON, S.E.—Non-resident Qualified Manager, lady or gentleman, required immediately; Optics an advantage; moderate salary to commence. Write Andrews, 96 High Road, S.E.9, stating age, experience and salary expected; applications not answered in five days respectfully declined.

MANCHESTER.—Assistant required for the Retail Counter of a High-class Pharmacy, not Store; must have good business experience and sales ability; no testimonials, but full particulars, with age and salary expected. 470/16, Office of this Paper.

MIDDLESBROUGH.—Required, immediately, Qualified Manager for branch in middle-class district; Photo and N.H.I. experience essential; salary and commission basis; usual particulars and photo (snap will do); applications declined unless answered in 7 days. Levy, Roman Road, Middlesbrough.

STOKE-ON-TRENT.—A comfortable berth for Qualified Assistant in small N.H.I. and Retail Business; permanency for suitable man (last over 5 years); usual particulars and salary expected, moderate; applications not answered in 10 days respectfully declined. 470/8, Office of this Paper.

ASSISTANT (Lady), Qualified: must have good appearance and Counter manners; good Saleswoman for Toilet Counter and quick at Dispensing; good opening for smart Assistant requiring permanency; full particulars and photo as soon as possible. Bell, Major Pharmacist, Mansfield.

ASSISTANT, Unqualified, Male; well experienced and reliable; original Window-dresser, N.H.I. Dispensing and Counter Work; reply giving full particulars and salary. Bannister, Chemist, Bloxwich, near Walsall.

CHEMIST-OPTICIAN (about 30-35), unmarried, to work up neglected business; applicants must be prepared to commence at small salary, which will be increased accordingly as business develops. Copies of references only to be sent with applications to 472/24, Office of this Paper.

JUNIOR required, from August 7 to September 24, for Holiday Relief, in and around London. Full particulars to 469/32, Office of this Paper.

LADY; good at Counter and smart Window-dresser; to manage neglected working-class shop, East London; small salary to commence; increase on results; not necessarily Qualified. Phone Valentine 1845, or apply 127 Belgrave Road, Ilford.

LADY, Qualified; part-time, chiefly advisory capacity; prospects. 226/126, Office of this Paper.

LADY, Qualified, required for Morden; must be able to take charge in absence of principal. Apply, stating experience, salary required and enclosing copies of references, to Whitworth, 189 Wandsworth Road, S.W.8. If no reply in 7 days position filled.

LEWIS AND BURROWS have vacancy for a Competent Male Assistant, Unqualified. Apply, giving full particulars of previous experience, to 146 Holborn Bars.

LOCUM, at once, for ten weeks; Young Qualified Assistant; experienced in Dispensing, Counter, Photo, but no D. & P. Full particulars, salary (board 35s.), references, photo, to Chemist, Totland Bay, Isle of Wight.

LOCUM, Qualified, August 8 to 19, inclusive. Salary required and reference to R. P. Bristow, 17 Oxford Street, High Wycombe, Bucks.

LOCUM, Qualified, outdoor, August 21 to September 2 or August 28 to September 9, inclusive; single-handed; light, chiefly Counter. State salary, references, &c., to Wavell, Chemist, 241 London Road, Mitcham, Surrey.

LOCUM, Qualified, required for Bank Holiday week-end; 2 hours Sunday, 2 hours Monday, Tuesday 9 a.m. to 8 p.m., Wednesday 9 a.m. to 1 p.m.; £2 10s. Apply Phillips, 1 Station Parade, West Acton, W.3, or Phone Acorn 0402.

LOCUM, young, either sex, Qualified, wanted for period September 4 to October 1 next; state terms and experience to Zeals Pharmacy, Ltd., 17 St. James Street, Weston-super-Mare.

M.P.S. J.C.Q.O.—Well-known Firm with several Retail Branches have vacancy for smart Qualified Junior seeking permanency and advancement to responsibility; must be thoroughly experienced in Dispensing and good-class Retail, and competent to take charge of Refractive Work in absence of principal; state full particulars first letter, age, experience, salary required, if single, when disengaged, and enclose recent photograph. 224/121, Office of this Paper.

QUALIFIED Chemist and Optician required for business just opened in outer West London; permanent and progressive post offered suitable applicant. Reply, giving full particulars of past experience, and state salary expected to commence. 472/4, Office of this Paper.

QUALIFIED Chemist required, about end of September; entirely manage small business in working-class district in Norfolk; quick Dispensing essential; good references required; permanency to right man; state age, experience, salary required plus commission, with photograph; stamped addressed envelope. 470/4, Office of this Paper.

QUALIFIED Junior required from August 9 to September 30 inclusive; must be accurate Dispenser, good Counterman and Window-dresser. Apply, giving full particulars, to Reynolds' Modern Pharmacy, 52 Barton Street, Gloucester.

QUALIFIED Lady Chemist required as Assistant by Chemist on South Coast; retail experience essential; state age, experience and salary required; must be good Dispenser. 471/3, Office of this Paper.

QUALIFIED Lady wanted, immediately, as locum for about 6 weeks; view to permanency; reply with usual particulars, salary, &c. 224/124, Office of this Paper.

QUALIFIED Locum, for 5 weeks commencing August 14. State salary required and usual particulars to the Secretary and General Manager, Industrial Co-operative Society, Ltd., Albion Street, Morley, Leeds.

QUALIFIED Locum wanted (Surrey), August 14-26 inclusive; please state salary required and give full particulars of age, references in first letter. 469/5, Office of this Paper.

QUALIFIED Man wanted, at once, for charge of branch; good Counterman, Window-dresser and Prescriber. Photo, salary required and references to A. V. Lester, 1 Station Road West, Canterbury.

REQUIRED at once, Qualified gentleman or lady; permanency; salary to commence £3 per week; apply stating age, experience and references, with photo, returned if stamped addressed envelope enclosed. 472/161, Office of this Paper.

REQUIRED, single Qualified Man (about 23) for high-class Dispensing and Counter; first-class references essential; state experience and salary required; apply first instance by letter only; applications unanswered in 5 days respectfully declined. Barnes & Marsh, 194 Upper Richmond Road, Putney, S.W.15.

SEASON Assistant, Unqualified, required at once, Lady or Gentleman, for 5 weeks; accustomed to good-class business, chiefly Counter work. Apply with particulars of experience, age, salary and photo if possible to R. Lindsay, The Arcade, Littlehampton.

UNITED STATES OF AMERICA

AN AMERICAN CORPORATION is desirous of using the service of a BRITISH CHEMIST in its Manufacturing Department. Applicant must have had actual plant experience in the manufacture of extracts, oleoresins and alkaloids. Application, stating qualifications, experience and salary required to 223/981, Office of this Paper.

SMART Qualified Manager (not under 25) for Leigh-on-Sea; with progressive ideas; expert knowledge of Photographic Trade; good prospects for capable man. Aspirin, 119 Marine Parade, Leigh-on-Sea.

UNQUALIFIED Assistant wanted, with good Dispensing experience and Counter; state full particulars first letter; London, S.E. 471/14, Office of this Paper.

WANTED, at once, Qualified Pharmacist-Optician (M.P.S. and J.C.Q.O.) as Branch Manager; no Buying. Please state qualifications, experience, age, height, &c., and salary required, together with at least 2 references, to the Sittingbourne Co-operative Society, Ltd., 123 East Street, Sittingbourne.

YOUNG Qualified Assistant wanted at once for 6 months; agricultural district; state age, wage, &c. 471/7, Office of this Paper.

YOUNG Qualified Assistant wanted, near Reading; light duties; time for further studies if required; state age, height, experience and salary required; give references. 470/10, Office of this Paper.

WHOLESALE.

J. E. ELLIS, LIMITED, HORSFORTH, LEEDS, require Young Laboratory Assistant in Perfumery and Toilets Department; state age and experience.

LARGE London Proprietary House requires Smart Man for the Checking of Orders; one with good knowledge of Proprietaries, Drugs and Sundries; must be speedy and accurate worker. State age, experience, references and salary to 224/122, Office of this Paper.

PILL AND TABLET MAKER.—John Richardson & Co. (Leicester), Ltd., require a fully competent Pill and Tablet Maker; must thoroughly understand the various processes of coating, and be sufficiently experienced to exercise control of the department; applicants will please give full particulars of past experience and remuneration required.

REPRESENTATIVE for Lancashire required to call upon Doctors, Dentists, Veterinary Surgeons and Chemists with high-class British Proprietaries. Applications will only be considered from gentlemen owning a Doctors and Veterinary connection recently worked. State age and firms previously represented, and supply details of importance in first letter. Apply "T.," 223/970, Office of this Paper.

REPRESENTATIVES calling on Chemists required for all territories by old-established company making push with Well-known Proprietary Line. First-class Salesman, with established connection only, invited to write with full particulars, in confidence to Box ZJ982, c/o Deacon's, 5 St. Mary Axe, E.C.3.

REPRESENTATIVE required by leading London Sundry House for Midland Counties calling on Retail Chemists; connection already established; car essential. Write, giving fullest particulars, age, &c., to 224/125, Office of this Paper.

REPRESENTATIVES with connections wanted throughout the British Isles to market new line, nationally advertised, on particularly advantageous terms, and which is unique, the merits of which have been proved to be perfect. 471/350, Office of this Paper.

SURGICAL DRESSINGS.—Counter Assistant (18-25) for Stockroom; smart; must have sound knowledge of Wools, Lints, &c.; West End; state salary. 224/120, Office of this Paper.

TRAVELLERS having connections with Chemists, Hairdressers and Stores who are allowed to carry an extra line required for Provinces in England; generous commission basis to commence in company extending its sales activities. Write for appointment to 469/35, Office of this Paper.

WANTED, immediately, Commission Men calling on Chemists for partly established line showing good profits. Apply in writing, stating age, experience, territory covered, present lines carried, and giving date suitable for interview, to Dyanese, Limited, 30 Birley Street, Blackpool, marking envelope "Agent."

COLONIAL, INDIAN AND FOREIGN.

WANTED, for the Far East, Qualified Pharmacist (not over thirty), single, good experience of Manufacture and Packing of Proprietaries essential; four years' agreement; first-class passage paid. Apply "Orient," 224/119, Office of this Paper.

SITUATIONS WANTED.

RETAIL (HOME).

A.A.—LOCUM or permanency; Qualified (21); reliable and trustworthy; excellent references; available immediately. Stevenson, 30 Ramsden Dock Road, Barrow-in-Furness.

A.—LADY ASSISTANT (23) desires post; 6 years' Counter experience; thoroughly reliable; no Dispensing; London district preferred. Miss D., 65 Tavistock Gardens, Ilford.

A.—PHARMACIST, M.P.S. (47), disposing of business, offers himself as Branch Manager or Assistant; all classes of trade; active, honest; London or district. 471/13, Office of this Paper.

A.—PHOTO, Pharmacy, D. & P., Assistant, gentleman (21) Unqualified; first-class experience all branches N.H.I., Counter, Displays, Agricultural, Clerical, Stock; speak German, French; moderate salary; South Coast, Brighton, Hastings district and permanency preferred. Write "Goodwin," 80 Blythe Vale, S.E.6.

A.—QUALIFIED (29), married, requires permanency; Manager or Senior; at present managing; conscientious worker; excellent Counterman, Window-dressing, &c.; West End experience; free one month. 472/5, Office of this Paper.

A QUALIFIED, thoroughly experienced Branch Manager; successful Provincial/London record; desires permanency; would locum. "Milton," 66 Clonmell Road, Tottenham, N.17.

ACTIVE, Qualified Manager desires change after 6 years in country town; previous excellent London experience; would welcome seaside or large town. "Chemist," 15 Courteuay Street, Newton Abbot, Devon.

ALL-ROUND Experienced, Unqualified, well recommended, capable of supervising staff and assuming charge; single; college trained for 1914 Minor. T. W. H., 80 Howell Road, Exeter.

AN Experienced, energetic, reliable man, now disengaged; unqualified; splendid references; West End, seaside; tall, married. MacLellan, Wotton-under-Edge, Glos.

AS Locum Manager or Assistant; 30 years' good experience; Counter, Bookkeeper, Dispensing and Worker. "Prescriber," 130 Scott-Ellis Gardens, N.W.8.

AS Locum or permanency; Pharmacist (24); disengaged August 14 to September 3; permanency after September 23; very highly recommended. Winson, 165 Lomerdale Road, Normanton, Derby.

ASSISTANT or Branch or Locum; energetic, reliable, experienced; Qualified Chemist; excellent references; disengaged; single; moderate. Keats, Pax-Holm, Street, Somerset.

ASSISTANT (referred Part II) (22); first-class experience Dispensing and Counter; requires locum work or permanency; disengaged. W. H. S., Derby Villa, Pill, Bristol.

ASSISTANT, Unqualified, experienced and reliable business man, seeks berth anywhere; locum, season or permanent; good personality, excellent references; disengaged July 29th. March, c/o Mr. H. C. Edwards, Chemist, Hastings.

ASSISTANT, Unqualified, single, active; first-class general all-round experience; Dispensing, &c.; personal interview; free any time. Jones, 8 Kingswood Avenue, Queen's Park, N.W.6.

ASSISTANT (21), Part I, disengaged, requires temporary position for one year before Part II training; part- or full-time; trustworthy, conscientious; N.H.I. and Counter experience; Midlands preferred. 469/3, Office of this Paper.

ASSISTANT (21) requires situation; Referred Pharmacognosy; good experience; adaptable and quick. B. R. Jarrett, 344 Causeway, Fishponds, Bristol.

ASSISTANT (23), Unqualified; disengaged until end of October; waiting for next qualifying examination; tall, good address; thoroughly experienced in centre of city; Counter and Display, Photographic, quick Dispenser; small salary; highest references. Silverman, 200 Newfoundland Road, Bristol, 2.

ASSISTANT (31), Unqualified; Dispensing, Counter, Window-dressing and Photography; disengaged; will interview. Huxtable, 73 High Street, Gravesend.

BIRMINGHAM Area preferably, but not essential; all-round experience; good references; permanency, but locum undertaken; disengaged. Hanley, 64 Hunter's Road, Birmingham.

CHEMIST and Optician (27) desires Managing Partnership with a view to ultimate succession, preferably in the West of England; capital available. 469/4, Office of this Paper.

EXPERIENCED Locum (24), Qualified; third-year medical student; excellent references; free now; terms moderate. Griffiths, 358 Caerleon Road, Newport, Mon.

JUNIOR Assistant requires situation; good experience; Dispensing, Shop work, Photography; quick worker; made many official preparations in bulk. 471/19, Office of this Paper.

LADY Assistant requires post; good Retail experience; capable Saleswoman; seaside or country preferred. 471/2, Office of this Paper.

LADY Dispenser (Hall); 15 years' experience in Dispensing and Counter; requires post with Doctor or Chemist; London or near; good references. Robertson, 7 Colville Square, W.11.

LADY, M.P.S. (26), accurate Dispenser, capable, energetic, desires change, Tunbridge Wells or near. Moles, 55 Queens Road, Aldershot.

LADY (32), Unqualified; experienced Dispensing, Photographic, Bookkeeping; capable, energetic; free September; London preferred. E. J., 27 Camberwell Grove, Camberwell, S.E.5.

LOCUM; disengaged; any position or period; thoroughly competent, experienced, reliable, industrious worker. Chemist, 56 Rudloe Road, Balham, S.W.12.

LOCUM Dispenser or part-time duties in Retail; elderly, Qualified; experience; kindly state duties and salary. 472/14, Office of this Paper.

LOCUM; first-class all-round experience; frequently repeated up-to-date references. Fitt, 36 St. Stephen's Road, Norwich.

LOCUM (Lady); disengaged from August 5 to August 13; Dispensing, Shorthand, Typewriting, Bookkeeping, Housekeeping. 472/3, Office of this Paper.

LOCUM, M.P.S., J.C.Q.O.; vacant from August 21 to 26 inclusive. Turner, 39 Highbury Road, Bulwell, Notts.

LOCUM or Assistant; experienced; abstainer; disengaged August 1; moderate salary; good references. Chemist, 142 Hill Lane, Southampton.

LOCUM, Qualified; disengaged July 31 to August 13; also September 16 to 23, inclusive. Wood, c/o Stanleys Ltd., 640 Lordship Lane, Wood Green, N.22.

LOCUM, Qualified; retired Chemist, N.P.U.; recommended; disengaged till August 11 and after September 9. Oakes, 33 Brunswick Road, Southend-on-Sea.

LOCUM, Qualified (45); well recommended; vacant dates, August 12-19 inclusive; London or near preferred. Howell, c/o Andress, Chemist, Crewe.

LOCUM (21), referred Pharmacy; four weeks from August 4. Armstrong, 23 Stafford Road, Waddon.

LOCUM (46); disengaged July 31 to August 13, also August 26 onwards; Unqualified; reliable, experienced in all branches; excellent references. Middleton, 45 Liverpool Street, King's Cross, W.C.1.

LOCUM (50), disengaged; experienced D. & P.; references. Newell, 90 Eland Road, London, S.W.11.

LOCUM (55); keen, capable; disengaged July 31 to August 13; Qualified Pharmacy and Optics; terms reasonable; abstainer. Phone Acorn 3302. Ellis, F.B.O.A. (Hons.), 311 Uxbridge Road, W.3.

M.P.S. (35); married; thorough all-round experience; Matriculated; "Square" trained; trustworthy; over 5 years' management working-class district last position; good personality and appearance; excellent references; London. 472/7, Office of this Paper.

PHARMACEUTICAL Chemist; young, industrious, reliable; sound experience in many branches; London and Provincial; wishes for position with Pharmacist in Provinces, seaside, country or town; East Anglia preferred; free when suited. 471/20, Office of this Paper.

PHARMACIST, wide experience, no capital, recently relinquished business due to high rent, rates and local depression, seeks immediate opening in any of the following:

1. Responsible Manager where owner seeks partial retirement.
2. Opportunity of acquiring small business on deferred terms of payment with interest.
3. Would join another who has capital in any proposition where experience and ideas can be of value.
4. Open to responsible position in any branch of pharmacy, wholesale or retail, where enterprise, organising ability and experience would ensure a progressive and permanent outlook.

East Anglian, 471/30, Office of this Paper.

PHARMACIST; experienced Manager and Buyer; thorough all-round knowledge of business; open for engagement in similar capacity. "Worker," 470/27, Office of this Paper.

QUALIFIED Assistant (30); 14 years' experience in Dispensing, Counter, Photographics; disengaged. C. Raddats, "Moseley," St. Fahian's Drive, Chelmsford, Essex.

QUALIFIED Lady, 14 years' experience, requires situation near Hendon or Golders Green; disengaged. 468/40, Office of this Paper.

QUALIFIED, Male (23); Counter, Dispensing, D. & P.; lower salary to learn Optics; anywhere. C. Ormston, 223 Upper Brook Street, Manchester.

QUALIFIED Male (24); 5½ years' experience in good industrial district; N.H.I., Photographic, Counter Work; year's experience Norfolk; seeks position city; keen, presentable; free middle September; slight knowledge Optics. 470/9, Office of this Paper.

QUALIFIED (21½); excellent references, good appearance, etc.; wishes to gain further experience and qualify in Optics. Disengaged. 469/26, Office of this Paper.

QUALIFIED (26), disengaged, as Manager; good London experience; excellent references; quite reliable. M., 21 Abbott's Park Road, Leyton.

QUALIFIED (32) desires locum, September 4-13 and after September 16. Mr. Higson, 915 Manchester Road, Over Hulton, Bolton.

QUALIFIED (35), single, desires permanency; excellent references; South or West England preferred. 471/25, Office of this Paper.

UNQUALIFIED Lady; 3 years' experience Dispensing, Counter, Part I, Doctor or Chemist. Read, 40 Norman Road, Newhaven, Sussex.

WOMAN Pharmacist, Qualified, efficient, experienced Business, Hospital, Doctor, seeks engagement. 469/11, Office of this Paper.

YOUNG Qualified Gentleman, now disengaged, desires situation in high-class pharmacy; South Coast or inland spa preferred; highest credentials. Norman Hart, 24 Cumberland Avenue, Grimsby. Phone 3109.

40S. Weekly as Assistant; young Qualified Man with good references seeks experience; summer or longer; Scotland only. 470/36, Office of this Paper.

WHOLESALE.

A SALES Representative, M.P.S., desires new post; excellent selling record; age 28, tall; will travel anywhere. 472/11, Office of this Paper.

EXPERIENCED Representative (35), with sound Chemists' connection in Yorkshire, Lincolnshire, Derbyshire, Nottinghamshore and Leicestershire, desires position with established house; own car; Patents, Toilets and Sundries. 472/12, Office of this Paper.

FOREMAN Pill and Tablet Maker; 27 years' experience in all branches; Sugar Coating, &c. A. Goldstone, 47 Evington Parks Road, Leicester.

KEEN Salesman; 12 years' retail experience (London and suburbs), desires post as Representative with well-known Drug, Toilet or Sundries house; own car. 471/37, Office of this Paper.

MANUFACTURER of Toilet Preparations, &c., with experience of Druggists' Sundries seeks post in either capacity London or near. P..B. 84/8, Office of this Paper.

MEDICAL Representative; 10 years' experience calling on Doctors, Dentists, Chemists; open for engagement; good knowledge of Therapeutics; credentials will bear strict investigation; would reside any territory. 471/36, Office of this Paper.

PH.C. (25), Public School and University education, seeks position at home or abroad, preferably Hospital or Wholesale; experience in Retail and Small Manufacturing; also three years' teaching experience. 469/25, Office of this Paper.

PHARMACIST, experienced Representative, desires engagement; excellent Chemists' connection; Midlands to South Wales; also Propaganda. "Chemist," 3 Ashling Villas, Cheltenham.

REPRESENTATIVE (Qualified) desires position on a salary and expenses basis; own car, and thorough knowledge of Drug Trade; live connection in South Yorks and Lincs. 471/4, Office of this Paper.

TRAVELLER, with sound connection London, Southern and South-Western Counties, seeks re-engagement end of August; own car. P.C.B. 84/11, Office of this Paper.

COLONIAL, INDIAN AND FOREIGN.

PHARMACIST, experienced Continental, French, Spanish, Italian, desires change to represent good-class English or Continental house; single; would consider retail; travel anywhere. 436/6, Office of this Paper.

FOR SALE.

CASH Register, made by National Company; very slightly used; latest finish; suit quick trade; bargain. Write to R. England, 16 Kenwyn Road, Wimbledon, S.W.20.

MISCELLANEOUS.

A "BEST Fitted and Equipped" Pharmacy pulls trade; new and secoud-hand fittings and showcases of all kinds and sizes. Write enquiries to or call at PHILIP JOSEPHS & SONS, LTD., Shopfitters, 90/92 St. John Street, London, E.C.1.

BANKRUPT STOCK.—Houbigant Powder, perfect condition, in Blanche, Rose, Ochre-Brun, 3s. 9d. size for 20s. per dozen, post free. Electra-Ray Ever Wavers; sets of three electric hair wavers, boxed, complete, 80s. per gross, post free; retail price 3s. per box. Empire Trading Co., Empire House, St. Martin's-le-Grand, London, E.C.1.

CHEMISTS' FITTINGS in Oak or Mahogany. 7-ft., 6-ft. and 5-ft. Dispensing Screens; 10-ft., 8-ft. and 6-ft. Wall Cases; 10-ft., 8-ft. and 6-ft. Glass-fronted Serving Counters; 10-ft. and 12-ft. Drug Fittings; 5-ft. All-glass Counter; Silent Salesman, 6 ft. high; 4-ft. Nests Counter Drawers. Real Bargains. Value for money. Rough sketches free. Send to GEORGE COOK, The Working Shopfitter, 27 Macclesfield Street, E.C.1. Clerkenwell 5371.

CHEMISTS' FITTINGS.—We hold an immense stock of Drug Fittings, Dispensing Screens, Glass Fronted Counters, Perfumery Cases, Nests of Drawers, Wall Cases, Silent Salesmen, Upright aud Flat Counter Cases, Plate-Glass Counters, Cash Tills, Display Stands and Glass Shelves, &c., ready for immediate delivery at competitive prices. Write or call for List. F. MAUND & E. BERG (SHOWCASES), LTD., 175/9 and 336 Old Street, London, E.C.1.

FOR SALE.—Two Steam Jacketed Copper Boiling Pans, in excellent condition and recently tested. 225/109, Office of this Paper.

FOR SALE.—Small Plastic Mixer and 6 by 12 in. Triple Roller Mill with granite rolls. 225/103, Office of this Paper.

FOR SALE.—"U"-Shaped Drying and Mixing Machine, central discharge. 225/104, Office of this Paper.

FOR SALE.—Jacketed Copper Boiling Pan with tipping action, tested; also Johnson Filter Press with plates 15 in. diameter. 225/105, Office of this Paper.

FOR SALE.—Laboratory size Disintegrator on Stand, in really good working order. 225/106, Office of this Paper.

FOR SALE.—Small Breaking or Kihbling Mill with rolls 5 by 5 in. and Edge Runner Mill. 225/107, Office of this Paper.

RUDDUCK & CO., 219-227 Old Street, London, E.C.1, for Chemists' Shop Fronts and Interior Fittings, Show Cases, &c. Estimates, Drawings and expert advice free; call and inspect our newly designed stock, also the reconditioned Fittings.

SHOPFITTINGS and Fixtures. King's can equip a Pharmacy with a complete range of modern fixtures in oak or mahogany from £75; we would welcome a visit to our showrooms; now ready, new catalogue No. C.D. 1013, post free on application. J. C. KING, LTD., 42-60 Goswell Road, London, E.C.1.

WANTED.—Sifter and Mixer for dry powders, with pulleys for power; give particulars and lowest price. 225/108, Office of this Paper.

EXCHANGE COLUMN.

WANTED.

WANTED, in good condition, 1923 B.P.C., 1932 B.P., Laurance's Visual Optics and Sight Testing, last edition; prices to W. P. W., 32 East Hill, Wandsworth, S.W.18.

ODD Lots of Cut-glass Perfume Bottles. Please state quantity and price to 224/118, Office of this Paper.

Printed for the Proprietors by EYRE AND SPOTTISWOODE LIMITED, His Majesty's Printers, East Harding Street, E.C.4, and Published by the Proprietors, MORGAN BROTHERS (Publishers), Limited, at 28 Essex Street, Strand, London, W.C.2.—*July* 29, 1933. (62/66)

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